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Surgical removal of impacted teeth using air turbine unit

■ *Robert M. Hall, D.D.S., Pittsburgh*

One hundred and twenty completely impacted lower third molars were removed by the author, using tungsten carbide burs rotated at speeds of 200,000 to 350,000 rpm and accompanied by a coolant spray. Results were very gratifying since reduction of both tooth and bone structure was considerably simplified. Operating time was reduced 30 to 40 per cent, and trauma and postoperative pain were reduced approximately 50 per cent. The unit employed in the study is portable and can be used either in a hospital or office operating room.

The problem of removing impacted teeth has confronted general practitioners and oral surgeons for many years. Several methods have been proposed for the removal of impactions, and of these, three have become the most used—the chisel and mallet, the hand osseosector and the surgical bone bur operated at 10,000 to 20,000 rpm. Unfortunately, none of these methods has been satisfactory for me.

The surgical bone bur running at speeds of 10,000 and 20,000 rpm has been the least traumatic and the most promising but presents the problem of overheating and burning of the osseous structure, which results in destruction of the bone cells and postoperative pain.[1] Scorching of the bone also impairs healing, as the destroyed tissue must first slough off before new tissue can regenerate. The use of a coolant spray, effectively directed, however, has greatly reduced, if not prevented, burnishing of the bone. Vibrations which are a hazard at these speeds and the pressure required by the operator to cut through dense bone and tooth structure make the procedure very difficult. The use of speeds in excess of 40,000 rpm, however, reduces the vibrations of the drill head and the force required by the operator to cut through hard tissue.

The chisel and mallet and the hand osseosector have been used extensively for the removal of impactions. These are used alone or in conjunction

with the surgical bone bur, but regardless of how used, when heavy, dense, cortical bone is encountered, the trauma produced by the blow is relatively severe.

■ *Object of Study*

The high incidence of postoperative complications as a result of trauma associated with currently practiced technics gives rise to the realization that a less traumatic procedure for removing impacted teeth is needed. Since medium speeds of 40,000 rpm and a coolant has done much to reduce traumatic sequelae, we elected to investigate the use of speeds of 200,000 to 350,000 rpm in combination with an effective coolant spray.

The object of this study, therefore, was to evaluate the use of ultra high speed equipment for the removal of impacted teeth. Speeds in excess of 250,000 were used to facilitate the removal of overlying bone encountered.

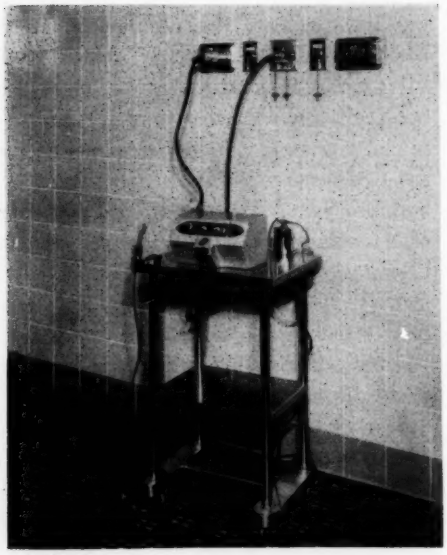

Fig. 1—The Weber Dental Air Turbine Unit adapted for oral surgery procedures at Shadyside Hospital. Note air and electrical outlets, foot control, mount holding contra-angle and reservoir for coolant

■ *Methods and Materials*

The size of the unit was approximately 10½ by 7 by 6¼ inches, and was mounted on a platform with a bottom shelf that was used for holding the air hose, electrical connection and foot control (Fig. 1). The instrument was powered by 80 pounds of air pressure. The handpiece with the bur, and the tubing that attached the handpiece to the unit, were detachable and were sterilized in airtight Formalin chambers for two hours or overnight. This is the method employed for instruments that cannot be autoclaved. A rack with the various burs was also kept in the Formalin chambers for sterilization. Before use, the handpiece and tubing were rinsed by running sterile distilled water through them to remove the Formalin. A reservoir for the coolant spray was mounted on the table with the machine.

Sterile, isothermal, distilled water was used for the coolant spray instead of normal saline solution to prevent clogging of the intricate mechanism in the rotor. The coolant was sprayed through the head of the handpiece directly onto the bur through two openings with a force of 80 pounds (Fig. 2). This method of introducing the coolant spray eliminated the possibility of the spray being cut off from the bur. The great force with which the spray was administered also kept the area clear, thus enabling the operator to have a satisfactory view of the operative site. It was necessary, however, to have an

efficient aspirator for the evacuation of water and other debris to prevent the coolant spray and blood from pooling up and obstructing vision.

Three main types of burs, all having tungsten carbide heads, were used. Tungsten carbide is one of the few materials that will withstand the extreme speeds and friction to which it is subjected. These three burs were no. 8 round bur, no. 10 round bur and no. 557 cross-cut fissure bur. The no. 8 round bur was used primarily for "wiping away" the overlying bone from the bone impactions. (The term "wipe away" appears to be the best term to describe the action of the bur.) The no. 10 round bur was used for removing the bone overlying and surrounding impacted teeth and for "wiping away" the bone of a torus palatinus. The no. 557 cross-cut fissure bur was used for sectioning teeth.

The contra-angle burs that were used by us originally proved unsatisfactory because they were too short to reach the desired depth. A set of regular handpiece burs was therefore given to a watchmaker who shortened these to the desired length of ⅜ of an inch longer than the accepted contra-angle bur. This remedied the situation in which the handpiece rides on the ridge of the socket thus preventing the bur point from reaching the necessary depth to facilitate the removal of the tooth. These burs can now be procured commercially in this desired size from any of the regular dental surgical supply houses.

■ *Technic*

Thorough roentgenographic study was made of all patients so that complete visualization of the conditions present was possible preoperatively.

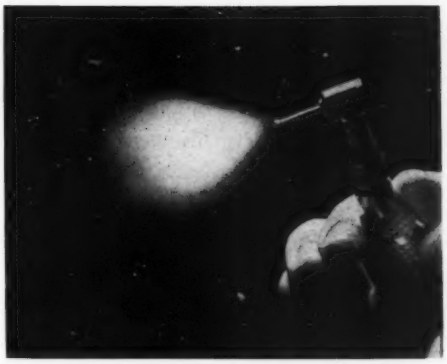

Fig. 2—Close-up view of contra-angle in operation with emission of coolant spray

Although the anesthetic was somewhat determined by the anticipated extent of the surgery, all patients received relatively the same type. The night before surgery, 1.5 grains of Carbrital was given. The morning of the operation, Carbrital, 1.5 grains, was again given 90 minutes preoperatively, and then meperidine 75 mg. and atropine sulfate 1/100 grain were given 20 minutes before surgery. In the operating room all patients initially were given intravenous thiopental sodium, 2.5 per cent, and succinylcholine chloride 0.2 per cent, in saline solution, and an endotracheal tube was inserted nasally. After intubation the patients were maintained on nitrous oxide and oxygen, succinylcholine chloride and thiopental sodium. Metabutoxycaine hydrochloride, 1.5 per cent, was injected locally during surgery for hemostasis. Occasionally meperidine also was given during surgery to reduce the amount of thiopental sodium required.

Whenever possible all incisions were made by separating the soft tissue from the necks of the teeth, extending it distally, just to the lingual of the external oblique ridge. The periosteum was stripped back with the oral mucosa. A relatively long incision was made to assure sufficient working area. It was found that it was better to have a reasonably large flap than one that was too small, in order to prevent traumatization of the soft tissue during the operation. In view of these observations there should be no hesitation in outlining flap designs of sufficient size to provide maximum visibility, wide access, and a broad surface of bone on which the flap margin may rest for optimum healing.[2] The mucoperiosteal flap was reflected to enable good visualization of the area. The air turbine unit with a no. 8 round bur was used to wipe away all overlying and obstructing bone. No more pressure was exerted on the contra-angle than would be employed when writing with an ordinary ink pen. The bone that was removed by the bur was converted immediately into an emulsion by the high pressure coolant spray and was removed by suction. After sufficient obstructing bone had been removed to permit visualization of the tooth, small amounts of bone were removed both buccally and distally to create a small cavity to facilitate elevation of the tooth. The tooth was then ejected from its bony crypt with an elevator. If, however, the tooth could not be removed with very little pressure being used on the elevator, then sectioning of the impacted tooth was utilized. This was accomplished with a no. 557 cross-cut fissure bur; additional space was created and the sections of the tooth were removed easily with an elevator. However, it was found that sectioning seldom was necessary.

After the tooth was removed, the socket was flushed with isothermal normal saline solution and cleared with suction. After ascertaining that debridement and hemostasis were complete, the mucoperiosteal flap was returned to its normal position and approximated with no. 000 black silk. A 4 by 4 gauze pack or sponge was placed over the operative site as a pressure pack. If other impactions were present, they were removed as well since trauma was minimal. The patient was then extubated and sent to the recovery room until sufficiently recovered to be returned to his room.

■ *Discussion and Conclusion*

Since use of the air turbine unit is relatively new, little has appeared in the literature on the subject. In 1958, Kilpatrick[3] stated that he had found that postoperative sequelae were greatly reduced and that the patients showed an overwhelming preference for the high speed technic.

At Shadyside Hospital, the air turbine surgical bur has been used for the removal of 120 complete bone impactions, mainly impacted mandibular molars and maxillary cuspids. In performing these operations, the air turbine unit was used exclusively. Our evaluation of the postoperative results when it was used as compared with those when another method was used indicated the following:

1. Postoperative swelling was slightly reduced; most of the edema that occurred could be ascribed to the large flaps that were reflected.

2. Postoperative bleeding was rela-

tively the same, but has never created any particular problem.

3. Trauma and postoperative pain were reduced about 50 per cent. The lips showed no evidence of irritation or abrasion because of the light touch applied, and since the instrument was powered by air pressure, no heat was produced.

4. The length of time required for surgery was reduced by approximately 30 to 40 per cent.

5. The small amount of effort required resulted in ease of operation and less fatigue for the operator. Since the vibratory range of the instrument exceeded that of sonic perception, less trauma was experienced by the patient. Virtually no pain was referred to either the temporomandibular joint or the inferior border of the mandible.

Because of the many advantages of this method, especially the reduction of postoperative problems and the reduction of stress on the operator, I and my associates have adopted and installed the instrument in our private office.

Attending oral surgeon, Shadyside Hospital, St. Johns Hospital and Ohio Valley Hospital.

1. Archer, W. H. Manual of oral surgery, ed. 2. Philadelphia, W. B. Saunders Co., 1956, p. 120.

2. Dedolph, T. H., and Clark, H. B., Jr. Histological study of mucoperiosteal flap healing. J. Oral Surg. 16:367 Sept. 1958.

3. Kilpatrick, H. C. Removal of impacted third molars utilizing speeds up to 200,000 rpm. Oral Surg., Oral Med. & Oral Path. 11:364 April 1958.

■ Steroid Therapy

Of basic importance in the use of steroid therapy is the knowledge of the possible effect of the administration of an endocrine hormone on the patient's endocrine glands. For even the least amount has some effect. The degree of effect produced depends upon how much hormone is administered and how long. If the patient receives a small dose of an endocrine hormone, his own glands will produce that much less in order to maintain a normal balance. When ACTH is given to a person, his own anterior lobe of the pituitary gland promptly produces less than it did previously. If the dose of ACTH exceeds one unit a day, the person's own gland stops producing adrenocorticotrophic hormone. For one week or 10 days, this does no obvious harm, but after that period, atrophy begins. If a person receives more than one unit daily for a long time, say three months, then his own anterior lobe will have undergone a severe atrophy. During the same period, the excessive stimulus will cause the adrenal glands to hypertrophy. After three months these glands will be from three to four times the normal size. If ACTH administration is discontinued, the anterior pituitary gland will slowly resume its function; but even after six months, it will not yet have returned to its original size. At the same time, the adrenal cortex, which now receives only the subnormal stimulus from its own pituitary monitor, rapidly atrophies and six months after the ACTH administration was stopped it will not have returned to its normal size and function.—*R. A. Kern. The Use and Abuse of Steroid Therapy in Allergic Disorders. Transactions and Studies of the College of Physicians, Philadelphia, June 1958.*

A look around the corner—what is ahead in hospital care

■ *Donald J. Galagan, D.D.S., M.P.H., Washington, D. C.*

Hospital care of patients has changed rapidly and continuously in the past 25 years. These changes have involved the entire field of health care and it is anticipated that public demand for health services will be phenomenally higher in the future. As a result there must be considerable alteration in the mechanics of health care to make it more comprehensive but less expensive. Dentistry will play an increasingly important role in hospitals and in the care of chronically ill and bedfast patients. It is anticipated that a sizable portion of the dentist's income will come from some type of group payment arrangement with the dentist using much more auxiliary personnel than in the past. Considerable research is needed on the application of dentistry in hospitals, the development of new equipment, the training of dental students in hospitals and the organization of dental practice, in addition to basic research in dental health problems.

Changes come about so quickly in these days of rapidly developing technical and scientific progress that it is difficult to see them clearly in perspective, much less understand their full import to health. The difficulties of predicting the course of scientific events were demonstrated recently in a survey made among the senior staff of the Public Health Service in which these experienced scientists were queried on the breakthroughs they would predict in medicine, health and related fields. The respondents included physicians, pathologists, biologists, chemists, administrators, and representatives of the other professional disciplines connected with the life sciences. In reply to the question, "What are the most likely breakthroughs in research and program content in your particular field?" a common response was, "During my professional career—the last 25 years—I could not have predicted a single breakthrough which has taken place in the special field in which I work."

What can be concluded from these rather discouraging comments—that one should not attempt to look ahead—around the corner? I do not think so. Perhaps very few people could have predicted 25 years ago that dental caries would be prevented in millions of young Americans by the simple process of adding a few pounds of fluoride to community water supplies, or that the antibiotics would influence so considerably the whole practice of curative medicine. It is unlikely that either McKay or Fleming could have predicted in advance the precise breakthrough which each provided in his special field of endeavor.

On the other hand, a number of people, looking at the chain of events between the original discovery of fluorides and penicillin and their own particular

moment of history, have been able to project ideas about those trends into the future with some degree of prescience. It is possible to determine the probability of future developments by studying the relationship between a series of past events and projecting a like or similar trend into the future. No one could have read the challenging series of predictions by such men as David Sarnoff, Charles P. Taft and Earl Warren, in the recent book entitled *The Fabulous Future; America in 1980,*[1] without being impressed by the value of their thoughtful statements about tomorrow. Since man is a rational being, he not only can but should use his power of reasoning to project his ideas into the future.

It is in this general way that I propose to take a look around the corner. I shall not attempt to forecast major breakthroughs but, rather, attempt to project some existing ideas. Naturally this approach will yield straight line extensions of today's ideas, and be a sort of "souped up" version of 1958. I should note that I can speculate on this subject with perfect equanimity because I am not a hospital dentist. This characteristic, you see, qualifies me as an "objective" observer of the hospital scene.

■ *Changing Dimensions*

First some of the changing dimensions of our society and our economy which may influence hospital care will be examined, and the possible impact which these changes may have on dental service in hospitals will be explored. As a background for the consideration of hospital services in a changing culture, it would be well to look at some of the demographic, sociological and economic aspects of the present day environment.

In the United States, there now are some 175 million people—more than double the number at the turn of the century. Predictions are that this figure will increase to over 225 million by 1975.[2] There is, and will continue to be, an excess of females over males. Life expectancy has increased by 20 years since 1900. This increased life span for more people has brought a tremendous increase in the older segment of the population. If present mortality rates continue, the number of people 65 years and older will increase from the current 14 million to 20 million in the next 15 years. However, it seems likely that the number of older people will far exceed even this extraordinary estimate because the application of already known and newly developed therapeutic measures will continue to extend life expectancy. Obviously, a much larger population with more elderly people means new and additional needs for hospital services in the future.

In order not to emphasize unduly the impact which the increasing number of older persons will have on society, it should be pointed out also that there has been a baby boom in recent years. By 1970 there will be approximately 75,000,000 children under age 18, constituting almost 40 per cent of the population. The increases at both ends of the age scale have continued to balance the average age of the American population. Significantly, these increases also have increased the dependency of the population by virtue of the numerical superiority of the young and the old over those in the middle, or wage-earning, years.

Fifty years ago the United States had an agricultural economy; today, two thirds of the people are city dwellers. Faster and better means of transportation have provided people in rural areas with close ties to nearby cities. Furthermore, we are a migratory people. According to the 1950 census, more than a third of the nation's families moved within a three-year period. Houses are on wheels, and meals are on wheels, and, I learned recently, even schools are on wheels. The development of a population which can move about so readily has tremendous implications when patterns of health services are projected into the future.

Formal education is reaching a higher level throughout the country. As recently as 1940, only one half of our youth were high school graduates. Today, about 65 per cent of the young people graduate from high school.[3] The number of students who go on to institutions of higher learning has doubled since 1940, and is expected to double again by 1970.[4] By the turn of the century, it is anticipated that every other American will go to college. As is well known, the higher the level of education, the greater the demand for health services.

The tremendous upsurge in the nation's economy over the past two decades has influenced the way of life noticeably. The national income has sky-rocketed, and industrial productivity and employment have reached new heights. Significantly, an increasingly larger share of the national income has gone into wage and salary payments to the labor force. More dollars in the national cash register also means greater demand for health service.

And, of course, there have been many other notable changes, including automation, more leisure time and new communication devices with an immense potential for keeping people better informed. Not to be discounted are certain developments during and since World War II which have influenced people's basic attitudes toward health and affected the actions they may take on health matters. One of these changes was the wartime opportunity for millions of men and women in military service to receive adequate medical and dental care for the first time in their lives. Another factor has been the phenomenal growth of voluntary health insurance plans and other methods of financing medical and related health services.

The net effect of these demographic, social and economic changes has been the creation of a new middle class, considerably more numerous and long lived than before, better educated and with more resources to purchase the things they want —including better health service. Therefore, the potential for people to demand more and better hospital care and more and better dental service, already exists and will increase in the years ahead at a rate that is difficult to imagine. About all that can be said is that the demand for health services in the future is going to be phenomenally higher than it is today.

■ *Hospital Service in the Future*

The character of the changing health picture in this country also has significant implications for the kinds of hospital service which will need to be provided in the future. The common infectious diseases of childhood and young adult life, although still present, no longer consti-

tute a major national health problem. Emerging today are the chronic and degenerative diseases, sensory disorders and disabilities resulting from accidents. Elderly patients with heart disease, hemiplegics, mentally retarded children, the emotionally disturbed, children with severe cerebral palsy and muscular dystrophy, persons disabled for long periods as a result of accidents—these patients will occupy many of the hospital beds of tomorrow.

The hospital of the future is going to be considerably affected by the rising costs of hospital care. Increased hospital construction and maintenance costs, the complex character of today's medical service, the specialization within medicine and related fields, the increased length of the hospital stay for the growing number of the chronically ill, and the high cost of professional time each contribute to a superior, but extremely expensive, service. In view of the changing character of the problems requiring health supervision, longer and longer periods of increasingly expensive professional care are needed. The time is rapidly approaching when the hospital may have to undergo some basic functional changes.

In short, the expanding population is changing in age distribution, location, and ability and desire to purchase health service. The combination of these factors, plus the increasingly high cost of hospital care and the changing character of diseases, is likely to bring about some noticeable changes in health services in hospitals.

In the past, the pattern of health services has been split into highly compartmentalized fragments. A group of professional disciplines has been concerned with hospital care, with preventive medicine, with mental health, and with the private practice of curative medicine and dentistry. Although there has been some overlapping of the responsibilities and some interchange of service between these several professional groups, essentially they have been quite independent of each other. One of the bulwarks of this segmented pattern of health service has been the hospital which has played a unique and major role in caring for the seriously ill. The present general hospital has been designed primarily to provide a workshop for the physician and surgeon in treating patients with grave illness or critical injury. However, in view of the pressures of a changing environment, the hospital of the future undoubtedly will serve a much broader and more comprehensive function in the community than it has in the past. It will have to offer facilities for the promotion of health and the prevention and treatment of all diseases, not just the restorative and curative service in which it now is engaged. In order to serve these broad functions it seems likely that there will evolve a sort of "shopping center" for health where everyone will go to obtain what they need in the health field.

Prototypes of this kind of community health plant already are in existence in a few progressive communities.[5] In this facility of the future, the health center or hospital will house, or will incorporate in close physical proximity, most or all of the health resources of a community. Perhaps the phrase "health campus" describes this idea of a site providing the general location for a group of loosely knit health service units and health related activities,

much like the university campus provides the location and some organization for a number of different colleges which are grouped together to form a university.

The basic services of the hospital, as known today, still will be available in this health shopping center of the future. But in addition to these minimal functions, preventive services, rehabilitation services, counseling services, health educational services, pediatric and geriatric services, research activities, the private practice of medicine and dentistry—in fact, anything that has to do with health—will be available and conducted in this one geographic location, each in its own unit.

Instead of a helter skelter scattering of these familiar elements of health service around the community, there will be an integration of these functions and services in the health center which can eliminate duplication, facilitate their use, hasten the inter-reaction between professional disciplines, and still not become so large and so planned as to lose the wonderful quality of independent initiative and action.

A second, somewhat older idea is the proposal that there be a regionalization of hospitals.[6] Many countries with more comprehensive forms of social medicine have established a regional system of hospitals in which there are varying degrees of service available at different sites. The regional hospital system, *per se*, never has caught on in this country. However, a variation of this arrangement has great potential here, and is simply a more formal operating relationship between the general hospital and specialized units for long-term and other kinds of specialized care. At the hub of these arrangements in the future undoubtedly there will be something like the complete hospital center or campus already described. It may be surrounded by a network of more or less comprehensive hospitals where there will be available either a general or specialized service to smaller population groups. In such a system, a stream of patients, staff and technical services will flow constantly from one level to another. Even though they may not all be in the same formal organization, an established working relationship between units will accomplish the same purpose as the so-called regional hospital system.

The third functional characteristic of the hospital of tomorrow, destined to find wide acceptance in the future and related in some ways to the "shopping center" and to the regional concepts, is the provision of care to patients on a progressive or graduated basis.[7,8] In this concept, the various hospital services are organized to revolve around the needs of the individual patient and his current condition. The patient is moved, perhaps from an area reserved for intensive treatment during the acute stages of an illness, to the less comprehensive care available in an intermediate type of unit when he has improved, to a self-care unit when he can take care of himself, perhaps in an adjacent nursing home or related domiciliary. As the patient continues to improve, he may be placed on a home-care program, with an intermittent visiting type of health service as his only professional supervision.

An inherent feature of this progressive kind of patient care is the movement of the patient to a more or less comprehensive phase of service as his condition im-

proves or worsens. No longer will every patient be treated the same. No longer will every hospital patient have to be dressed in night clothes and made to lie down in bed to be waited on hand and foot, no matter what his problem. The patient is mobile, so to speak, but always under some kind of medical or health supervision, differing only in the intensity of its application.

There seem to be several specific advantages to a hospital and health care system which embodies the three concepts mentioned. If they are adopted, they should reduce the over-all cost of hospital care. Progressive patient care and some form of regional or otherwise inter-related hospitals should make it possible to provide better service to more people at less cost to the patient by using less complex facilities and less comprehensive professional supervision to get the same kind of job done. The health shopping center also should enable a community to organize better to meet its health needs through the centralization and organization of services, and not to be overlooked, it broadens the financial base for the support of the plant itself.

None of these three concepts are new. One of them has been in existence for a decade or more, the other two are somewhat more recent. Yet they have not found ready acceptance in the pattern of health service in this country. I would predict that the sheer weight of economic and social forces, as described earlier, will create so much pressure that some or all of these ideas will have to be implemented if the future demands for health services are to be met effectively. My projection of these concepts of the hospital of the future, then, forms the basis for the following discussion of the expanded dental services in the hospital.

■ *Expanded Dental Services*

Without question, the dentist of this future day will be an integral part of the hospital or health system. There will be an interdependence between the dentist and the hospital which does not exist at present. The dentist will have freedom to use all of its facilities, and will be accepted in the restorative or rehabilitative sections of the surgery unit. He will admit and discharge his own patients in the system, and his close association with the other members of the health family will give him an insight into the whole person. In turn, the dentist will give these other members an understanding of oral health problems which will make teamwork in the health field a reality.

If the dentist is to adjust to the situation where most health needs are met in centers or related units and where patients are mobile and yet may be in the hospital system for a very long period of time, he will have to make some changes in his approach to providing service. First of all, the scope of dental treatment services in the hospital of the future will have to be broadened considerably. Today, except in the long term domiciliary type of institution, much of the dentist's hospital work is limited to oral surgery. In the future, undoubtedly he will conduct both general and specialty practices in the professional office unit of the hospital center itself, or in the office wing of the smaller hospitals surrounding the major center.

A complete inventory of dental services will be available in the health center.

Here there may be a fairly large number of dentists in group practice, perhaps with some kind of standard ratio between general practitioners and specialists. There will be public health dentists in the public health unit and health educators in the education unit, each contributing to the delivery of a comprehensive dental service to a community. In the outlying units, dentists in general practice and dental auxiliaries will bring basic dental services to a larger segment of the population, and of course, specially trained personnel will be available to render service to patients with special needs such as the handicapped child or the chronically ill.

The close association of the great family of medical and related services in the health center should condition the community resident to think of these sites as the place to go for health needs. A physical association of all the members of the health family, with interchange of ideas and concepts, sharing of some basic resources and facilities—a multidisciplinary group practice, if you will—with community support and understanding, will lead to a whole new concept of health service. The general medical practitioners, the dentist, members of the specialty groups such as the obstetrician and the orthodontist can share the same radiation device, the same accounting service, yes, even the same parking lot and the same supply rooms.

Better referral in this kind of group practice will become commonplace because there should be little or no economic threat or concern about the loss of a patient. The selection of an ethical dentist by the prospective patient in this center will become less of a problem than it is now. The mobility of the population has already been mentioned as one of its new and dominant characteristics. The stranger in the community can turn with confidence to the dental unit of the hospital of the future, being assured that the practitioners in that unit are reliable, conscientious and progressive. The advantages to be derived from the health shopping center are potentially as great as they are for existing business centers, and have the same basic underlying principle—a combination of diverse but related enterprises banded together for mutual gain.

With the increase in the length of time during which the chronically ill patient is under the aegis of the hospital, in the progressive type of patient care, the dentist must be equipped to treat the patient at any stage of hospitalization. Home dental care, and care in the various phases of rehabilitation will be more common than at present. Light, readily portable equipment will have to be available, and some of the dentist's armamentarium may be in a little black bag rather than in a super-colossal Cadillac-sized dental unit.

The financing of dental care services will be quite different from today's payment patterns. A sizable portion of the dentist's patients undoubtedly will come to him under some form of group arrangement—either insurance, fringe benefits, group contract, or similar third party arrangement, thus removing from dental practice the worry of establishing financial responsibility for each patient.

He will be using his professional time judiciously and effectively, delegating as many functions as possible to well-trained, adequately supervised auxiliary personnel, who will, themselves, have

learned their roles in the environment of or adjacent to the dental school.

■ *Discussion*

Perhaps all of these ideas seem too remote, too abstract, for present day consideration. What has been discussed up until now, labeled originally as predictions, really have been goals toward which to strive. They may not be achieved, and in fact, will not be unless some serious research is conducted and investigation made into practices still largely in the conceptual stage. My most meaningful predictions then, are directed toward the kind of research and investigation in which the dental profession must engage if it is to move ahead in this area and provide direction to studies of the effective use of hospital dental resources and services.

If the dentist is to become an integral part of the hospital system of tomorrow, it is clear that the role of the dental services in the hospital of today must be investigated, including such fairly obvious studies as the evaluation of the potential of routine examination on hospital admission and the effect of dental treatment on various kinds of systemic conditions, as well as on health itself. If this basic relationship is not documented more fully, the dentist may not be invited to play his proper role in the hospital of tomorrow.

If the dentist is to participate in the system of graduated or progressive care for hospital patients of the future, time and effort must be invested in the development of light-weight and portable equipment, so that, when necessary, the dentist can take his services to the patient. These efforts will require the combined action of the practicing profession, the dental trades industry and those in teaching and research.

If the dentist is going to operate in the hospital environment and take part in the evolution of the health service of tomorrow, research must be carried out on the use of the hospital as a site for teaching dental students. The use of the hospital in presenting a larger portion of the dental school curriculum, the extent of the student's involvement in the hospital routine and his exposure to hospital practices are obvious areas for intensive study.

A great deal of effort and energy must be concentrated on the study of methods of payment for dental services. The fact that the hospital has served as the site for much of the insured health service in the past suggests strongly that routine dental care, provided under the aegis of the hospital, may be the key to a major breakthrough in the use of the prepaid insurance principle for the dental care of the future.

Hopefully, the hospital environment also may provide the touchstone to real progress in the use of auxiliary dental personnel to perform certain patient services. In the hospital, where extensive use of all kinds of sub-professional workers is accepted practice and strongly encouraged, we may have, at last, the proper environment for research and experimentation in the extended use of auxiliary dental personnel. Little progress has been made to date in using para-dental associates, and the hospital setting may be the place to move ahead in this very productive area of investigation.

Lastly, I predict that we should do

extensive research into the organization of dental practice. For example, we need to concentrate on the development and application of the principles of group practice. I am referring not alone to groups of dentists practicing together in the rather limited way we see today, but also to the real multidisciplinary group practice to which I referred earlier, with the dentist working closely with the other members of the health service family. Only in this way will the dental profession be able to grow and change in parity with the evolution of the health service system of tomorrow.

The list of research needs is endless. Experimental opportunities are everywhere. The dental profession can take the initiative in developing new types of patient care within the hospital and between units of hospitals, and between different types of hospitals. Present research efforts of this kind in the whole field of hospital care appear to be sporadic and somewhat unorganized. Here is an opportunity for the dental profession to exert its professional leadership across the board in the health field.

At long last we are beginning to move ahead with dental research of a basic technical nature by taking advantage of the clinical matter seen every day, but experimentation in the organization of dental service, outside the hospital as well as in, has been sadly lacking. I predict that we will have to increase the pace of experimentation in the provision of dental service in the hospital environment, or the opportunity to participate in the health service of the future may be denied to us. We can shape the character of the hospital service of tomorrow if we use imagination in our efforts to solve the problems we face today, and have a sympathetic attitude toward and understanding of new approaches to old problems.

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Assistant chief, Division of Dental Public Health, Public Health Service, U. S. Department of Health, Education and Welfare.

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■ EDUCATION AND PROGRESS

True education makes for inequality—the inequality of individuality; the inequality of success; the glorious inequality of talent and of genius. Because inequality and not mediocrity, individual superiority and not standardization are the measures of the progress of the world.—*Felix E. Schelling.*

Removal of submaxillary gland sialoliths by intraoral incision with electrosection

■ *Maurice J. Oringer, D.D.S., New York*

When sialoliths are present in the body of the submaxillary gland, it has been standard practice to excise the entire gland through an extraoral incision. This is the only effective treatment for a gland heavily studded with widely spread calculi, but when only a few are present, sialolithotomy frequently is the most effective treatment. The calculi can be removed best under local anesthesia through an intraoral incision with the patient erect in the dental chair. The use of the electrosurgery scalpel permits rapid bloodless dissection and exposure of the calculi. They are then removed with curets.

Salivary calculi may form in any of the salivary glands, but occur only rarely in the parotid gland, and rather infrequently in the sublingual glands. The most common site is the submaxillary duct, and to a much lesser degree, the submaxillary gland itself. Occasionally they may be located in both the duct and the gland.

Sialoliths of Wharton's duct ordinarily do not constitute a difficult diagnostic or surgical problem. The involved region is accessible and clearly visible. The patient almost invariably gives a history of periodic swellings in the floor of the mouth usually induced by the sight, smell or taste of food which stimulates the production of saliva. The sialoliths usually dam off the duct, prevent the free flow of saliva into the mouth, and the resultant stasis of salivary fluids produces the periodic swellings, which tend to subside as the fluids are absorbed or seep slowly past the obstruction. Extraoral submandibular swelling may also be present.

The presence of sialoliths in the duct can be verified easily by digital palpation of the floor of the mouth over the duct, and by intraoral roentgenographic examination of the floor of the mouth. When calculi are present in the duct, they appear as radiopaque masses about 1 cm. medial to the mandible. The calculi usually are single cylindrical or cigar-shaped masses although they sometimes are small irregular masses, or may even appear as poorly defined moderately radiopaque areas. Sialolithiasis is frequently accompanied by secondary infection.

The treatment of submaxillary duct sialolithiasis is relatively simple. In most instances the operation consists simply of incising the tissues of the floor of the mouth and the duct, and removing the calculi with spoon or cup-shaped surgical curets or Allis forceps. This is followed by irrigation of the operative field with a mild antiseptic solution or normal saline solution. The incision does not require closure, therefore suturing is not indicated. A rubber dam drain usually is inserted into the incision to permit drainage for a day or two. Postoperative care con-

sists primarily of maintaining good oral hygiene. Healing by primary intention usually occurs without incident. Needless to say, when secondary infection is present it must be thoroughly eradicated before surgery is instituted.

Sialolithiasis occurring in the submaxillary gland proper presents a much more complex diagnostic and surgical problem. The symptoms frequently are inconclusive and not necessarily characteristic. Intraoral swelling may or may not be present. Extraoral submandibular swelling in the submaxillary triangle may be considerable or only slight, and there may be no history of recurrent swelling associated with stimulation of salivary flow by sight, smell or taste of food.

The most constant, and therefore the most reliable symptom is submandibular pain. Painful deglutition is also reported frequently. Intraoral occlusal roentgenograms of the mandible are negative, except in the uncommon instances in which calculi are present in both the duct and the gland. In the latter situation, the discovery of calculi in the duct may easily result in overlooking those in the gland; however, they are discovered eventually when the pain persists after the initial surgery and lateral jaw roentgenographic examination.

Sialoliths lying within the gland usually can be seen clearly on lateral jaw roentgenograms, unless faulty angulation causes superimposition of the calculi over the body of the mandible, which may obscure them sufficiently to prevent their visualization.

Intraglandular sialoliths usually are spheroid in shape and tend to be fairly regular in outline. They may be single large masses, multiple medium to large masses, or numerous small round or irregularly shaped masses, or they may appear as shapeless radiopaque shadows. The larger masses are often located in the deep smaller lobe of the gland near the origin of the submaxillary duct. (This part of the gland lies closest to the floor of the mouth.) Sometimes, however, the calculi are deeper and are near the center of the gland. The small granular types of calculi usually are widely distributed throughout the acini of the gland and present a buckshot pattern. Shapeless radiopaque shadows usually represent amorphous sludgy gravel.

When sialoliths are present in the body of the gland, surgical removal of the gland through an extraoral incision has been an accepted surgical procedure.[1-4] Among the reasons offered to justify this therapy are the inaccessibility of the affected region to intraoral instrumentation, poor visibility, difficulty of incising precisely the loose shifting areolar tissues of the floor of the mouth with the surgical scalpel, and the profuse bleeding that customarily ensues when these tissues are incised.

Sialadenectomy is not only a radical sacrifice of a useful structure, but also it is attended by considerable danger of accidental injury to a number of important anatomic structures; for example, there is danger of injury to the lingual, the facial or the hypoglossal nerves. The external maxillary artery and anterior facial vein usually must be ligated during the procedure.

Sialadenectomy is the only effective treatment for a gland heavily studded with small calcareous deposits that are widely distributed. However, when the

gland contains few solid calcareous masses concentrated in one region, sialolithotomy may be the most effective treatment. In these instances, the principal problem is one of accessibility. If satisfactory access to the gland can be gained by means of an intraoral incision through which the calculi can be removed without having to sacrifice the gland, then this becomes the most desirable treatment.

The handicaps of inaccessibility, difficulty of performing a precise dissection of the shifting loose areolar tissues of the floor of the mouth, poor visibility, and profuse bleeding can be overcome effectively by using the electrosurgery scalpel.

The long, slender electrode handle and the very slender surgical electrode with its hair-thin wire cutting blade greatly reduce the problems of accessibility and visibility of the operative field. The ability to incise easily the tissues as deeply and extensively as necessary without exerting pressure by simply floating the electrode through the tissues with a wiping or brushing motion,[5] and the relative freedom from bleeding after the incision is performed, also help to make intraoral dissection a practical and successful method for the conservative removal of sialoliths from within the submaxillary gland.

The following case reports are practical clinical examples of the efficacy of this method. One patient had calculi in both the duct and the gland, and the other had calculi deeply embedded in the body of the gland.

■ *Case 1*

The patient was a normally healthy 29 year old white woman. Her chief complaint was a generalized feeling of malaise, chills and fever, pain and difficulty in swallowing, a malodorous foul-tasting oral discharge, and recurrent swellings of the floor of the mouth and the extraoral submaxillary triangle of the neck.

MEDICAL HISTORY—The patient consulted her physician, who established a clinical diagnosis of sialolithiasis of the submaxillary duct or gland, and referred her to me for confirmation of his provisional diagnosis and for indicated treatment. The patient related that the swelling of the floor of the mouth had initially manifested itself approximately three months previously, and had undergone spontaneous remission several hours after its onset. The swellings usually appeared while, or shortly after, eating, recurring at irregular intervals. They had always subsided after a few hours. The present swelling had begun five days previously, but this time it had not subsided spontaneously. Instead, it became more pronounced. Her personal and family history was otherwise negative.

CLINICAL EXAMINATION — Extraoral examination revealed a moderately indurated region of slight swelling that was present in the right submaxillary triangle. No other adenopathy was present. The intraoral examination showed that the floor of the mouth was massively edematous on the right side, elevating and pushing the tongue somewhat toward the left side of the mouth. The orifice of the right submaxillary duct was enlarged and ulcerated, and from it oozed a thick malodorous mucopurulent exudate. The slightest amount of pressure on the floor of the mouth or movement of the tongue

caused increased exudation. The tongue appeared swollen and relatively immobile.

ROENTGENOGRAPHIC EXAMINATION—An intraoral occlusal roentgenogram of the mandible and floor of the mouth revealed the presence of three small irregular shaped masses in the right submaxillary duct region, lying parallel to and in the vicinity of the bicuspids and first molar (Fig. 1). The masses did not seem to be dense enough or large enough to occlude the lumen of the duct completely. A lateral jaw roentgenogram was taken to rule out the possibility of sialoliths also being present in the gland. This study revealed the presence of two densely radiopaque round masses, each approximately 0.5 cm. in diameter located beneath the inferior border of the mandible near the angle of the jaw and lying in a vertical position superimposed one on the other. A diagnosis of sialolithiasis of the duct and the gland was now clearly established.

TREATMENT—The patient's physician had initiated a regimen of parenteral penicillin therapy consisting of intramuscular injections of 600,000 units of aqueous suspension daily. This was continued for six days. Because of the acute secondary infection, only palliative treatment could be instituted at the patient's first visit. The duct was gently milked to express from it as much of the exudate as possible and to try to expel the calcareous fragments through the enlarged orifice. One small fragment was thus ejected.

Later when the flow of exudate from the duct had stopped, a flexible blunt silver lachrymal irrigating needle was introduced carefully into the duct, inserting it for a distance of 2 cm. A 5 cc. Luer type glass syringe was attached to the needle and was filled with an aqueous solution of benzalkonium chloride (1:1,000). The solution was instilled into the duct drop by drop. Irrigation was halted frequently to disengage the syringe and express the fluid from the duct, then it was promptly resumed. Some amorphous gravelly mucinous sludge was expressed from the duct by further milking. When only clear fluid was ejected after continued irrigation, another occlusal view roentgenogram was taken which showed that the calcareous deposits had been removed from the duct.

When the patient returned for treatment on the following day there was noticeable improvement in her condition. Her temperature, which had been 100.6°F. the previous day, was now normal. The extraoral swelling was unchanged, but the intraoral condition of her mouth was greatly improved. The tongue was less swollen and more mobile, and the duct orifice was almost normal in appearance. Milking of the duct failed to express any exudate. The orifice of the duct was first dilated with a flexible silver probe and the lachrymal irrigating needle was inserted. The irrigation was repeated and a small amount of mucinous sludge was expressed.

On the third day the tongue and floor of the mouth as well as the duct orifice were normal. There was no odor and no sign of purulent exudate. Milking and irrigation of the duct were nonproductive. The patient was now judged to be ready for surgical removal of the calculi within the gland.

After preliminary preparation with

Fig. 1—Case 1. Occlusal view of floor of mouth showing multiple calculi in lumen of Wharton's duct

benzalkonium chloride tincture and topical anesthesia, inferior alveolar and lingual block anesthesia were administered. The flexible silver probe was introduced into the duct to pinpoint the exact location of the calculi in relation to the duct. The probe was inserted almost its full length, until a grating hard resistance was encountered. A lateral jaw roentgenogram was taken with the probe in position. This film revealed that the tip of the probe was in direct contact with the superiorly positioned calculus, at a point just beyond the origin of the duct (Fig. 2).

The probe was kept in the duct in an elevated position, and the tongue was retracted firmly toward the left side with a wooden tongue blade. The submaxillary gland was displaced superiorly toward the floor of the mouth by constant extraoral pressure throughout the surgical procedure. The exact site for the incision was determined by measuring the distance that the probe extended into the duct. The incision, which was made with an electrosurgical scalpel with a 45 degree angled wire electrode, extended from the oropharyngeal junction anteriorly for 3.5 cm., reaching as far anteriorly as the distal aspect of the first molar. It ran parallel to the body of the mandible about 1 cm. medially along the line formed by the elevated silver probe in position in the duct. The incision was carried downward to the probe, cutting through the capsule and into the body of the small upper lobe of the gland.

Remarkably little bleeding ensued even after the incision was spread open with the beaks of a curved mosquito hemostat. A large cup-shaped curet 7 mm. in diameter was introduced through the incision, and after a minimal amount of careful manipulation the uppermost calculus was engaged and elevated toward the floor of the mouth. As it was lifted

Fig. 2—Case 1. Lateral jaw view showing silver probe in contact with one of calculi within gland

Fig. 3—Case 1. Postoperative lateral jaw view which shows no calculi present

through the incision it was grasped with an Allis forceps and was removed.

The curet was then reintroduced into the gland where it soon engaged the second, more deeply embedded calculus, which was removed in the same manner. A smaller blunt spoon-shaped curet was then introduced into the gland and gently manipulated in an exploratory manner, whereupon some resistance was encountered from calcareous sludge. Contact with the curet caused this material to disintegrate readily. When solid resistance could no longer be felt, the curet was removed and the gland vigorously irrigated with isotonic saline solution. As the irrigation was performed, the fluid was simultaneously aspirated from the gland. The fluid being aspirated from the gland was observed carefully as it passed through the glass tube connector in the suction tube and it was noted that a number of small fragments of calculus were passing through. After a few minutes only clear fluid was passing through. The curet was reinserted and gently manipulated but no resistance was encountered. After an additional 5 cc. of saline irrigation, an immediate postoperative lateral jaw roentgenogram was taken with the silver probe still in position. This film showed that all the calcareous deposits had been removed completely (Fig. 3).

The silver probe was withdrawn from the duct and a centipede rubber dam drain 4 cm. long was inserted down into the gland, with 2 mm. extending upward through the incision to permit drainage. One suture of no. 0000 braided silk was inserted at each terminal end of the drain to help keep it in position and reduce the possibility of its being displaced by movement of the tongue and tissues of the floor of the mouth.

On the first postoperative day the drain was removed and the gland irrigated with warm saline solution. Three small calcareous fragments were evacuated from the gland. The extraoral swelling was now very slight, and the submaxillary structures were no longer tender to palpation. On the third postoperative day there was no evidence of extraoral swelling, and palpation was identical to that felt on the unaffected left side. On the fourth postoperative day the two sutures and the drain were removed and only oral lavage performed. Complete healing resulted without further incident. Two large round calculi and six small irregular shaped calculi (Fig. 4) had been recovered from the gland, in addition to sludge and tiny fragments which had been aspirated. A final lateral jaw roent-

genogram which was taken three months postoperatively was completely negative, and the patient was discharged as cured.

■ *Case 2*

The patient was a 66 year old white man, a physician. His chief complaint was severe pain in the submandibular region of the right side of the face, moderate extraoral swelling, and considerable tenderness in the submaxillary triangle. Swallowing was so painful that he had refrained from eating as much as possible.

MEDICAL HISTORY—The patient gave a history of sialolithiasis of three years' duration with recurrent episodes of swelling and pain which subsided in a few days. His current illness was the most painful and lasting episode. He was a controlled diabetic; otherwise his medical history was essentially negative. He was somewhat obese, but his pulse, blood pressure and respirations were all within normal limits.

CLINICAL EXAMINATION—The extraoral examination revealed a moderate amount of extraoral swelling in the right submaxillary triangle. Pain response to light palpation was moderately severe. No other adenopathy was present. Intraoral examination showed no swelling. Other than slight redness near the orifice of the left submaxillary duct, the mouth appeared normal. Intraoral palpation in the posterior part of the right side of the floor of the mouth produced a very painful reaction.

ROENTGENOGRAPHIC EXAMINATION—The intraoral occlusal view was completely negative. A flexible silver probe was introduced the full length of the submaxillary duct and into the gland until it encountered resistance that gave off a grating sound on contact. A lateral jaw roentgenogram was taken with the probe in position. This revealed the presence of three well defined round calculi lying superimposed one on the other in a crescent pattern, with the largest one uppermost and the silver probe tip in direct contact with it (Fig. 5). A small lightly radiopaque area between the lowest and middle calculus suggested the presence of amorphous sludge or gravel in addition to the three masses.

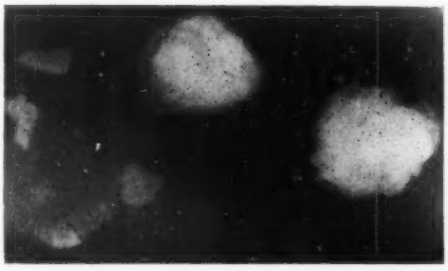

Fig. 4—Case 1. Two large round calculi and six small irregular fragments which were removed from submaxillary gland

TREATMENT—The patient was premedicated with 600,000 units of aqueous suspension of penicillin injected intramuscularly, and repeated on the following day at which time the operation was performed. After preparation of the region with benzalkonium chloride tincture and topical anesthesia, inferior dental and lingual regional anesthesia was obtained and supplemented with local infiltration anesthesia.

The flexible silver probe was inserted

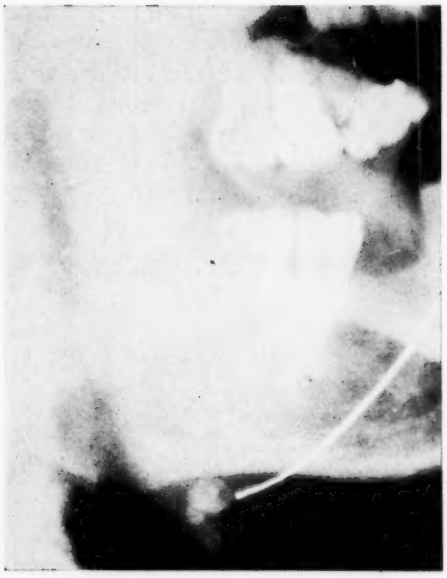

Fig. 5—Case 2. Lateral jaw view showing silver probe in contact with most superior of the calculi

into the duct and passed posteriorly until it made contact with the most superficial of the three calculi. The probe was kept in the duct throughout the surgical procedure and was maintained in an elevated position to lift the tissues of the floor of the mouth over it. The tongue was retracted firmly toward the left side with a wooden tongue blade, while the gland itself was displaced superiorly toward the floor of the mouth by firm extraoral pressure which was maintained throughout the operation. By digital palpation, exerting considerable pressure downward, the top calculus could be felt very slightly.

An incision 3 cm. in length, with the calculus positioned in the precise center, was made by electrosection with a 45 degree angled wire electrode. Centering of the calculus was estimated by measuring the length of the probe in the duct. The incision extended from the anterior pillar of the fauces anteriorly to the first molar region, following the outline of the probe. Without pressure, the incision was extended through the tissues of the floor of the mouth, the capsule of the gland, and into the body of the small upper lobe of the gland itself until the electrode contacted the calculus.

The incision was widened with the beaks of a curved mosquito hemostat, then the margins were retracted firmly. The uppermost calculus was removed by means of a small cup curet. Cup curets were also used to remove the remaining two calculi and some amorphous gravel. A blunt spoon-shaped curet was then introduced and manipulated gently to break up the sludge. The gland was then irrigated vigorously with isotonic saline solution which was simultaneously aspirated, and a considerable amount of calcareous debris was evacuated. After several minutes of irrigation without further trace of debris, an immediate postoperative lateral jaw roentgenogram was taken with the silver probe still in position (Fig. 6). All of the calcareous deposits had been removed from the gland. In all, three calculi were removed (Fig. 7), as well as a considerable amount of amorphous gravel. The largest calculus measured 0.5 cm. in diameter, the middle one 3.5 mm., and the most inferior one 3 mm.

A centipede rubber dam drain was inserted into the gland through the incision (Fig. 8) and approximately 2 mm. permitted to project through the incision into the mouth. The patient was dismissed with instructions to maintain frequent warm saline lavage and extraoral

Fig. 6—Case 2. Immediate postoperative lateral jaw view showing probe still in position. There is no evidence of calculi

applications of icepacks, and to remain on a liquid diet. The following day the drain was removed and the gland irrigated. Aspiration failed to reveal any further calcareous debris. The rubber dam drain was replaced, and the intramuscular injection of penicillin again administered.

On the third postoperative day the drain was eliminated and penicillin therapy discontinued. On the fifth postoperative day there was evidence of healing by primary intention with no evidence of cicatricial contraction. The extraoral swelling had subsided after the second postoperative day, and the intraoral postoperative swelling had almost completely subsided by the fifth postoperative day. By the sixth postoperative day the patient felt sufficiently recovered to return to his home in Central America.

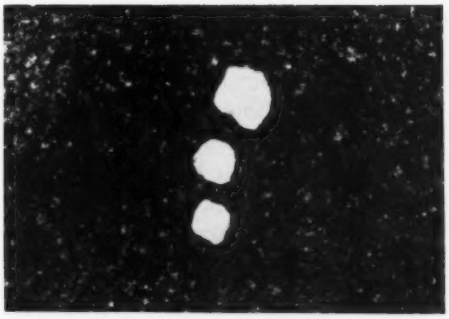

Fig. 7—Case 2. Three calculi removed from gland

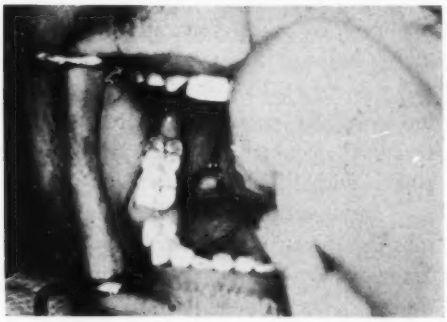

Fig. 8—Case 2. Centipede rubber dam drain being inserted into gland through intraoral incision

■ *Summary and Conclusions*

Because of inaccessibility and the difficulty of precisely incising the loose, shifting areolar tissues of the floor of the mouth down to and through the capsule of the submaxillary gland to remove calculus within the gland, sialadenectomy has been an accepted surgical procedure.

Incision by electrosection with the surgical electrode of the "radioknife," which can be performed without pressure simply by floating the electrode through the tissues, effectively solves the difficulties that otherwise make intraoral removal of sialoliths from the gland extremely diffi-

cult and sometimes impossible.

Despite the comparative inaccessibility of the region, the incision and dissection are performed easily without displacement or mutilation of the tissues since the operator merely guides the electrode while making the incision, and since the thin 45 degree angled wire electrode can be introduced readily into the region by its long slender handle without having to insert most of the hand into the mouth, as is necessary when using the cold steel scalpel. In addition, good hemostasis is obtained by the electrosurgery scalpel which helps to maintain good visibility in the operative field and sharply reduces the tendency to profuse hemorrhage that usually accompanies incision of these tissues with the cold knife.

Introduction of a flexible silver probe into the duct until it encounters the obstruction is very useful for pinpointing the exact location of a calculus and for establishing the precise region for the incision so that it is centered properly over the calculus. Incising the tissues precisely over the duct and gland assures immunity from accidental injury to the lingual nerve or to any of the veins that are present in the floor of the mouth.

Removal of sialoliths from the submaxillary gland is practical in all instances except those in which the calculi are widely distributed throughout the acini of the gland in a buckshot pattern. Complications from presence of amorphous gravel in addition to the solid sialoliths can be overcome satisfactorily by macerating the debris gently, then vigorously irrigating and simultaneously aspirating the wound. Cutting the rubber aspirating hose and inserting an empty glass anesthetic cartridge as a connecting tube make it possible to check on the aspirated fluids and to note whether any calcareous debris is being evacuated.

Conservative intraoral surgery offers a number of noteworthy advantages. The major consideration is the preservation of the gland for future function. Dangers inherent in the extraoral surgical removal of the gland, such as possible accidental injury to the lingual, facial or hypoglossal nerves, are avoided. In addition, it is not necessary to section the external maxillary artery and anterior facial vein.—22 *West Eighty-second Street.*

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■ EDUCATION AND KNOWLEDGE

One should have education and knowledge enough so that one doesn't have to look up to people; and then one should acquire more education so that one will be wise enough not to look down on people.—*M. L. Boren.*

Penicillinase treatment of allergic penicillin reactions

■ *Lewis H. Spiegel, D.D.S., Cedarhurst, N. Y.*

If the patient with an anaphylactic reaction to penicillin receives penicillinase within 24 to 48 hours after the reaction starts, the circulating penicillin will be inactivated and all acute symptoms will be relieved. There are no specific contraindications to the use of penicillinase, which is nontoxic and completely safe for parenteral injection. One case is reported in which the new drug was used.

The antibiotic most commonly used throughout the world today is penicillin: "In 1956 about 2,500,000 pounds of antibiotics were produced in this country, and, although there are 17 different antibiotics currently available, penicillin accounted for 597,589 pounds (38 per cent) of the total produced."[1]

Rarely is a patient encountered who has not had penicillin at one time or another. "There are few among us who, for some sound medical reason, will not have had penicillin administered during our lifetime. Thus, with present population figures for this country of more than 170,000,000 we are concerned with some 17,000,000 who may react to a penicillin contact."[1] In oral surgery, too, penicillin is still the antibiotic of choice because of its wide antibacterial spectrum and its particular effectiveness against those organisms which cause most oral infections, that is, the gram-positive streptococci and staphylococci.

With this increased use of penicillin there has developed an alarming rate of penicillin reactions, being variously estimated from 0.2 to 16 per cent of patients given penicillin.[2-4] Becker[5] has reported that the yearly death rate is between 200 and 300. The rate of life-threatening and nonfatal reactions is much greater and constitutes a serious therapeutic problem.

Until recently the treatment of these allergic reactions has been largely symptomatic and supportive. Anti-inflammatory agents such as antihistamines, ACTH and steroids have been employed in the control of these allergic manifestations with varying degrees of success. These agents, however, are not specifics in that they do not attack the antigen itself.

In 1940 Abraham and Chain[6] discovered an enzyme which could destroy the antigen penicillin in vitro. This enzyme penicillinase is a product of bacterial fermentation and is elaborated by many strains of bacteria, of which the more prominent are *Bacillus cereus, Escherichia coli* and various strains of staphylococci.

In 1956 Becker[7] reported on the in vivo antiallergic effect of penicillinase. He was able to demonstrate first in guinea pigs and later in human beings that peni-

cillinase was quickly effective in hydrolyzing circulating penicillin and that it was safe and nontoxic for parenteral injection. Chen, Bard and Belsito[8] confirmed these findings in animal experiments and concluded that penicillinase is a valuable and safe agent to be employed clinically in the treatment of the allergic reactions to penicillin because of its high penicillin-inactivating potency in vivo and its lack of toxicity and antigenicity.

Zimmerman[9] treated 52 patients with various manifestations of penicillin allergy and concluded as follows: "Penicillinase is a highly effective means of treating allergic reactions to penicillin by the most logical approach, i.e., the total destruction of the inciting antigen." Minno and Davis[10] after use of penicillinase on 42 patients reported as follows: "the use of penicillinase in the treatment of hypersensitivity reactions to penicillin is based on the logical knowledge that circulating penicillinase reduces all demonstrable penicillin blood levels to zero for prolonged periods of time, thus rendering the penicillin nonallergenic."

All the aforementioned investigators concluded that for best results penicillinase should be given as soon as possible and preferably within 24 hours after the onset of the reaction. Within one hour after the injection of penicillinase, all the circulating penicillin is inactivated, and this effect is maintained for from four to seven days.

Becker[5] stated, "I am sure that if every patient having a penicillin reaction were given penicillinase within 24 to 48 hours after the reaction started, I doubt that steroids would have to be given and I do not think we would see the severe prolonged reactions we are seeing now." It seems, therefore, that there now exists another valuable adjunct in the emergency treatment armamentarium. In my opinion anyone who administers penicillin should have penicillinase on hand and available at all times, and should be thoroughly familiar with the technic of its administration.

Penicillinase injectable is supplied in single dose vials containing 800,000 units of purified injectable lyophilized powder, and it is given by deep intramuscular injection. In anaphylactic reactions, it is recommended that 800,000 units be given intravenously immediately followed by 800,000 units intramuscularly.

There are no specific contraindications to the use of penicillinase. It is nontoxic and completely safe for parenteral injection,[8] even at dose levels many times those used clinically. The side effects consist chiefly of soreness at the site of injection accompanied by erythema and local edema. Chills and fever have also been reported occasionally. Fortunately, these reactions usually are transient and of no serious clinical consequence.

■ *Report of Case*

On March 31, 1958, a 43 year old white man, 6 feet tall, weighing 200 pounds, was referred by his physician for the removal of an infected tooth under local anesthesia. The medical history was normal with the exception of a coronary occlusion two years previously. The physician requested that the patient be given 600,000 units of procaine penicillin G in aqueous suspension in the gluteal muscle immediately before the removal of the tooth.

Approximately one-half hour after leaving the office the patient returned in a state of extreme anxiety, with a typically severe allergic reaction. There was generalized urticaria accompanied by severe itching, generalized angioneurotic edema, especially around the eyelids and joints of the hand. He had difficulty in breathing, was sweating profusely and had a temperature of 101°F. He appeared to be going into anaphylactic shock.

The patient was immediately given an injection of 800,000 units of penicillinase (Neutrapen) at the same site of the penicillin injection, and 40 mg. of hydroxyzine hydrochloride (Atarax) syrup by mouth to relieve his anxiety. He was put on a cot in the recovery room. Within three quarters of an hour he recovered. All the described acute symptoms were completely relieved. A check-up three weeks later revealed no recurrences.

■ *Summary and Comments*

A new drug, penicillinase, has been discussed and one case in which it was used has been reported. A review of the available literature reveals uniformly excellent results, especially when treatment is given early. Although there are relatively few reports concerning this drug, it was felt that because of its possibly life-saving character in anaphylactic reactions, its use should be more widely reported.—*650 Central Avenue.*

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EDITOR'S NOTE—*Although penicillinase may eventually become widely accepted for neutralization of penicillin reactions, it should not be relied on as the only source of therapy in anaphylactoid reaction to penicillin. In these instances there is so little time available for treatment that it is still considered wise to inject immediately 0.5 cc. of 1:1,000 epinephrine intravenously or subcutaneously and to support the patient with other resuscitative procedures. Penicillinase may justifiably be included as one of these, but it should not be relied on as the only form of treatment in such dire circumstances.*

Succinylcholine chloride in oral surgery practice

■ *John B. McVeigh, D.D.S., M.S., and Adrian O. Hubbell, D.D.S., Long Beach, Calif.*

Succinylcholine chloride may be employed with intravenous barbiturates to secure relaxation with the resistive healthy patient in light surgical anesthesia. Without administration of a muscle relaxant, such patients would require large amounts of anesthesia for routine surgical procedures. Intermittent injections of 5 to 15 mg. of succinylcholine chloride usually secure the relaxation needed.

Muscle relaxants have earned a rightful position as important adjuncts to sound anesthesia practice. Succinylcholine chloride, in particular, has proved useful as an emergency drug in the management of intractable laryngospasm.[1] More recently, succinylcholine chloride has been employed with intravenous barbiturates to allow oral surgical intervention on resistive healthy patients who, except for muscle relaxants, would require large amounts of anesthetic for routine surgical procedures. Included in this group are those with a short thick neck, the obese, those with a receded chin and the resistive patient. The objective is to provide as light an anesthesia as possible, consistent with surgical requirements. The use of light anesthesia results in shorter recovery time.

■ *Mode of Action*

An understanding of the mode of action of muscle relaxants requires, first, an acquaintance with the mechanism of muscle stimulation. It is generally agreed that acetylcholine is the link in the transmission of an impulse from a motor nerve to a muscle fiber. The nerve impulse causes acetylcholine to be released from an inactive precursor. This released acetylcholine depolarizes the region of the end-plate and is almost immediately hydrolyzed to choline and acetic acid by cholinesterase. Choline then recombines with the specific protein to re-form the acetylcholine precursor. This formation and breakdown of acetylcholine causes a change in potential which effects a muscle response.[2]

Muscle relaxants may be divided into two groups according to their action on the motor end-plate. Some relaxants act by interfering with the depolarization of the end-plate by acetylcholine. In effect, they block the formation of impulses by a competitive inhibition of acetylcholine.[3] Tubocurarine chloride and gallamine triethiodide belong to this first group and are considered nondepolarizing relaxants. The remaining relaxants act by causing a persistent depolarization of the end-plate which prevents repolarization from occur-

ring. Subsequent nerve impulses are ineffective while the end-plate is depolarized.[4] Succinylcholine chloride and decamethonium bromide belong to this second group and are considered depolarizing relaxants.

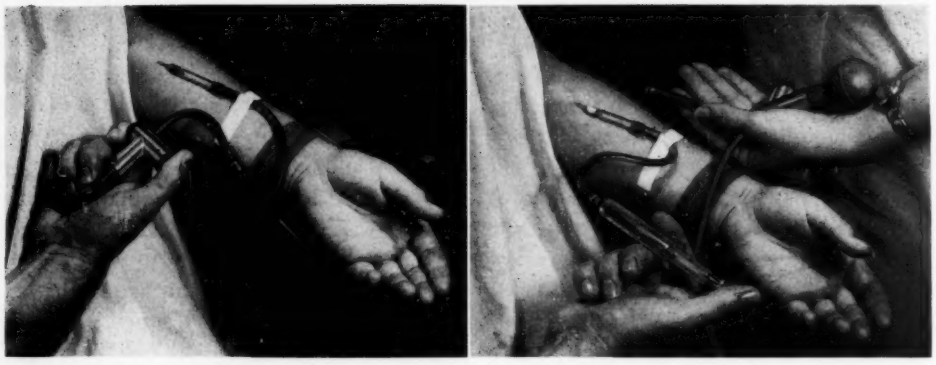
One of the most desirable properties of succinylcholine chloride is its short duration of action. Unlike the other muscle relaxants it is rapidly hydrolyzed by serum cholinesterase.[5] The first observable effects of succinylcholine on the body are fasciculations or muscle twitchings. This is presumably due to the depolarizing action at the muscle end-plate. When succinylcholine chloride is injected too rapidly, the twitchings become violent and there may be considerable postoperative muscle pain.[6] If small doses of succinylcholine chloride are injected at about the rate of 1 milligram per second, these fasciculations rarely occur.

■ *Technic*

Intravenous anesthesia by the "surge" technic has been described by one of us.[7] Most patients do well and have a rapid, pleasant recovery with this method of administration. To encourage early ambulation the level of anesthesia should be no deeper than necessary to cover the immediate surgical stimulus.[8] Surgery is commenced immediately after the effect of the initial surge of barbiturate is realized. Occasionally there is a short apneic pause after induction. During this period incision of the gingiva and elevation of the mucoperiosteum are accomplished. Ideally the patient will respond to spoken commands at the close of the operation. This is possible as the smoothing of the bone and suturing which terminates most oral surgical procedures may be performed with analgesia-amnesia.

Before the introduction of muscle relaxants it was necessary to carry the resistive patient into a deeper plane of surgical anesthesia than that described previously in this article, to achieve the same result. Succinylcholine chloride provides adequate relaxation in light planes of surgical anesthesia and allows surgery for the resistive healthy patients without the undesirable effects of prolonged deep anesthesia. Succinylcholine chloride should be considered if, after the induction dose of barbiturate, the patient is resistive. It may be given in intermittent single injections or by continuous intravenous drip. The intermittent single injections are more in keeping with the surge technic of intravenous barbiturate administration. This method allows moment-to-moment control of anesthesia depth which should be consistent with surgical requirements.

We use the "injector" rubber bulb syringe (see the illustration, left). This intravenous set-up includes 20 gauge needle, observation tube segment, connector, injector apparatus, tubing and supply of barbiturate. To administer the succinylcholine chloride, the connector at the end of the observation tube segment is detached and the succinylcholine chloride syringe is attached (illustration, right). To prevent muscle fasciculations the relaxant is injected slowly. The dose administered, of course, varies with the individual patient, but the average relaxing dose is 10 mg. Apnea rarely occurs with this small amount. Because of the rapid breakdown of succinylcholine chloride and because its action is not cumula-



Left: Dentist and patient shown with injector apparatus and observation tube segment used for administration of intravenous barbiturates. Injector is detached prior to injecting succinylcholine chloride. Right: Succinylcholine chloride is injected into observation tube segment. After injection of succinylcholine chloride, 3 cc. of barbiturate should be injected to clear tube of relaxant

tive, it may be readministered as required.

After the injection, the syringe is removed and the connector is reattached as in the illustration, left. A small amount of barbiturate should be injected after the administration of succinylcholine chloride to clear the observation tube of the relaxant. With a single intravenous dose of 5 to 15 mg., relaxation is present within 15 to 30 seconds. It attains its maximum in one to two minutes and usually disappears within five minutes.

For short operations one administration of relaxant is often all that is necessary. In longer procedures the size and frequency of necessary subsequent injections are influenced by the degree of surgical stimulation and the response of the patient. The experienced anesthetist-surgical team will anticipate the anesthetic requirement of the patient and thereby administer a smoother anesthesia.

■ *Discussion*

Intravenous anesthesia is accompanied by a high degree of amnesia. Patients have no recollection of the suturing which is done at the close of most surgical procedures, even though they may have reacted to this painful stimulus. This amnesia factor is quite valuable, as light anesthesia results in shorter recovery time. The use of succinylcholine chloride allows surgery for resistive patients with amnesic levels of barbiturate. Nitrous oxide with high percentages of oxygen may be combined with succinylcholine chloride and intravenous anesthesia to advantage for more extensive surgical procedures. This combination will permit less total dosage of barbiturate and shorter recovery time. Intravenous barbiturates depress the respiratory center; with this reduced ventilation it may require three to four minutes to wash out the inert nitrogen and establish an effective partial pressure of nitrous oxide. Therefore for short operations (under four minutes) there is no advantage in adding nitrous oxide to intravenous barbiturates to control recovery time.

Succinylcholine chloride is marketed

by several pharmaceutical houses. For office use the 10 cc. size bottle, 20 milligrams per cubic centimeter, is recommended. We have found it convenient to dilute the succinylcholine chloride with sterile water to a concentration of 5 milligrams per cubic centimeter. With this concentration it is easier to administer the 5 to 15 mg. dosage recommended previously.

Succinylcholine chloride is quite stable when stored in the refrigerator. It is reasonably stable without refrigeration, but it has been suggested that it be replaced every three months if refrigeration is not available.[9] As part of our routine the diluted succinylcholine chloride is removed from the refrigerator and 2 cc. or 10 mg. is drawn into a syringe. Two syringes of the diluted mixture are kept in each surgery room during the day's work. These are replaced as needed.

Succinylcholine chloride has outstanding flexibility and low toxicity. In clinical dosage there is no significant effect on the cardiovascular system. Its use does not seem to be connected with serious side reactions, such as the liberation of histamine.[10] In our experience with the small dosage recommended there have been few instances of apnea lasting more than 50 seconds and none longer than 75 seconds. The operator, nevertheless, must be prepared for varying periods of apnea and must provide pulmonary ventilation where indicated. It must be remembered that succinylcholine chloride should be an aid to, not a substitute for, sound anesthesia management.

■ *Summary*

Succinylcholine chloride has been used successfully in the management of intractable laryngospasm. More recently it has been employed with intravenous barbiturates to secure relaxation with the healthy resistive patient in light surgical anesthesia. We have found that intermittent injections of 5 to 15 mg. of succinylcholine chloride will most often secure the relaxation needed without apnea. This technic permits surgery at amnesic levels of barbiturate anesthesia. For longer procedures nitrous oxide with high percentages of oxygen will lessen the total dosage of barbiturate needed and materially reduce recovery time.—*123 Atlantic Avenue.*

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Methods of fixation in mandibular bone grafts

■ *Fred A. Henny, D.D.S., and William D. McClelland, Jr., D.D.S., Detroit*

A new appliance is described which can be used quickly, easily and effectively to retain mandibular segments in their correct anatomic relationships after partial resection of the mandible. The device consists of a Kirschner stainless steel pin, 9 inches long and 3/32 inch in diameter, threaded for its entire length. Two nuts and washers are provided with each pin. Both insertion and removal are rapid and simple.

Mandibular resection is fraught with many serious surgical considerations. Not the least of these is the problem of adequately maintaining the anterior and posterior mandibular segments in their correct anatomical positions after the resection. If this problem is solved, four important achievements are thereby established:

1. Preservation of the region as a suitable graft site.
2. Avoidance of gross facial defects and asymmetry.
3. Facility of restoration of effective mandibular function.
4. Prevention of severe displacement of the tongue and other vital soft tissue structures in the floor of the mouth which are supported by the mandible.

When the resected portion of the mandible is positioned far enough anteriorly to provide a posterior segment possessing sound teeth, the situation is favorable, for it can be handled with ease by the application of an intraoral acrylic splint, arch bars with intermaxillary traction or a combination of both. These are standard procedures and do not require discussion here.

The task becomes considerably more complex when the jaw is edentulous, when the resected region is large or when it extends posteriorly beyond the dentition. The aforementioned intraoral methods are ruled out in this circumstance and other devices must be utilized. There remains of course, the alternative of providing no support for the remaining mandibular segments. However, when this is done the fragments float in their soft tissue beds and, thus, fall prey to the traction of attached muscles and to subsequent postoperative fibrosis. The sequelae of esthetically unpleasant facial asymmetry, gross defects and mandibular malfunction are, at the best, undesirable.

Procedures and appliances that have been employed in the past were cumbersome, complicated, expensive, time consuming and usually ineffective (Fig. 1). The early appliances were made of a wide variety of metals and inert materials, but all the various pins, screws or plates that were used proved to be faulty in that they soon became corrosive or precipitated chemical salts which had a detrimental effect on the surrounding tissues.

Considerable improvement was

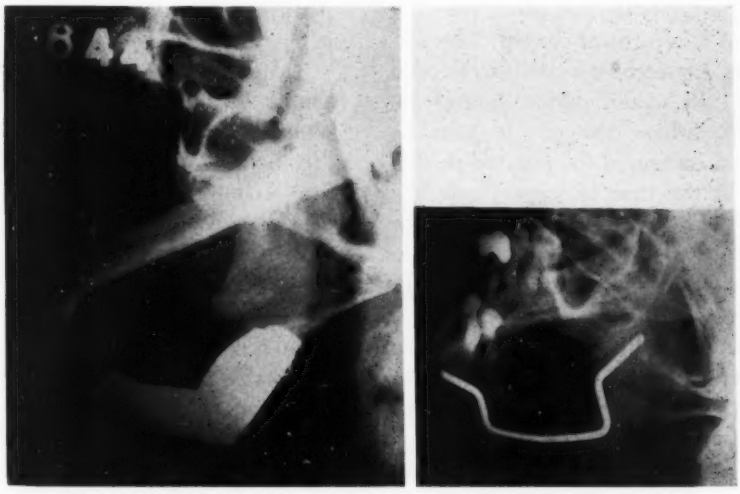

Fig. 1—Left: Tantalum plate prosthesis replacing a portion of body and ramus of mandible. Plate was removed subsequently because of secondary infection. Right: Stainless steel wire bent to resist displacement of fragments. This is a frequently successful method but wire is difficult to adjust properly at the operating table

achieved with the advent of Vitallium since it is well tolerated by the tissues.[1] However, it proved to be unsatisfactory because although it is durable, it is not workable or adjustable at the operating table. It is difficult and expensive to prepare, and the finished product is absolutely unyielding.[2] The operation must be performed to precise preoperative specifications; otherwise, the appliance is useless.

Tantalum[3] is a slightly more flexible metal, but does not possess the dimensional pliability originally hoped for. It is very difficult to work and it is almost impossible to avoid sharp edges which sooner or later perforate the oral mucosa, thus allowing the development of a secondary infection. Appliances constructed of this metal are also almost impossible to adjust at the time of surgery.

Any plate whether it is Vitallium, tantalum, acrylic resin or any other material requires firm fixation proximally and posteriorly. This is usually accomplished by means of screws. Insertion is frequently laborious and time consuming. These same handicaps also hold true of external pin fixation methods, the most common of which is the Roger Anderson splint.[4] A specialized heavy portable engine or hand drill is required for placement of the pins, in addition to special nuts, clamps and connecting rods. The bulky and probing configuration of the extraoral appliance necessitates extreme caution on the part of the patient to avoid bumping or pressure in the area of the apparatus, particularly while sleeping. The possibility of secondary infection is great. The fact that mandibular segments may require stabilization for several months, or

perhaps permanently, just about rules out this splint for fragment control. The usefulness of a straight nonflexible threaded pin also falls within narrow limits.[5] Inability to fashion the pin to simulate anatomical contour of the resected portion of bone at the time of surgery robs the appliance of one of its prime requisites for success.

What then are the prime requisites for a successful appliance?

1. Adaptability. The appliance should lend itself to rapid adjustment to the proper shape and length at the operating table.

2. Strength. Although resilient and pliable enough to permit hand contouring, the appliance should be strong enough to maintain its final form and resist the stresses of fibrosis and tension, including those eventually encountered during full masticatory function.

3. Low cost. Although cost is not an imperative factor it must be considered to be of some importance.

4. Simplicity of design. The appliance should not require special or expensive equipment for its manipulation or insertion.

5. Ease of insertion. The appliance should go to place rapidly and with a minimum of manipulation.

6. Size. The device should provide firm stabilization without being sufficiently bulky to cause undue muscular tension or pressure on the overlying soft tissues, thus minimizing the possibility of pressure necrosis.

7. Versatility. The appliance should be suitable for use: (a) as a solitary unit; (b) in conjunction with an immediate bone graft, and (c) as a solitary unit to which a bone graft is subsequently added.

8. Noncorrosive. The material of the appliance should be chemically inert in its relationship with the surrounding hard and soft tissues and should not corrode. This property should allow the appliance to be sterilized in the autoclave preoperatively in the customary manner along with the remainder of the surgical instruments.

9. Facility of removal. The ability to permit simple and rapid removal in the event of such a necessity is of importance.

10. The appliance should, of course, do the job for which it was primarily intended: maintenance of the anterior and posterior mandibular segments in good position.

A device which fulfills these requirements has been developed and has been used by us on 30 patients (Fig. 2). It consists of a Kirschner stainless steel pin which is threaded for its entire length and is available in two diameters. The type most applicable to the problem under consideration is 9 inches long and 3/32 inch in diameter. Two nuts and washers

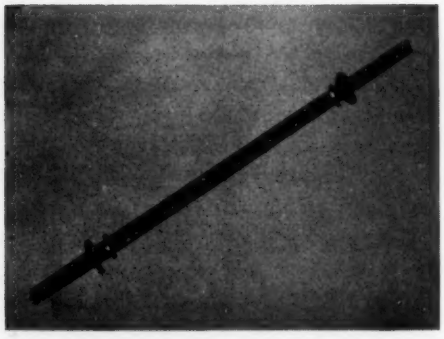

Fig. 2—Threaded pin with nuts and washers. It may be bent as desired and cut to the proper length at time of operation

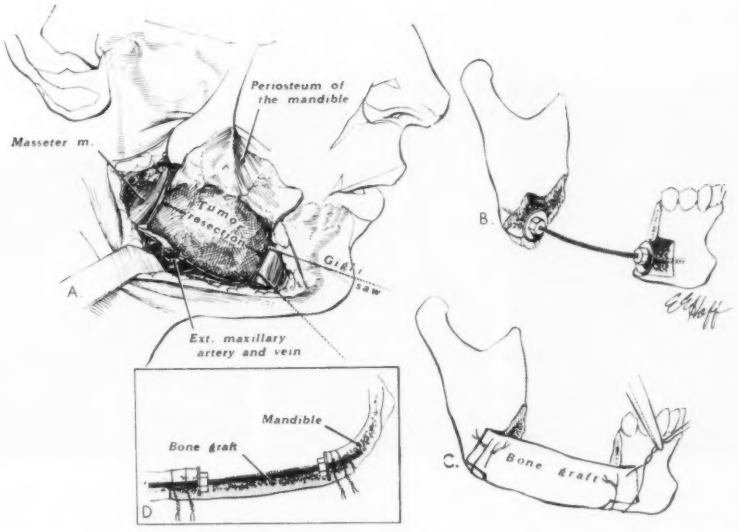

Fig. 3—A, mandible and tumor dissected free and mandible sectioned anterior and posterior to lesion. B, lateral view of appliance in place and illustrating areas of decortication prior to insertion of immediate bone graft. C, lateral view of bone graft wired in position overlying indwelling splint. D, superior view of defect with appliance and bone graft in place

are provided with each pin—one set for each end.

The appliance is unsurpassed for its simplicity, effectiveness and ease of handling. It can be shortened to any desired length by simple cutting with heavy wire cutters. Hand pressure is sufficient to bend the wire rapidly and easily to the desired shape. Its strength for the task required is unquestionable. Insertion is rapid and simple. Drill holes 2 cm. in length are drilled into each fragment, and the ends of the wire are positioned into the drill holes in the medullary portion of each segment. The washers are moved into contact with the bony fragments and the nuts are rotated toward the washers until the proper distraction of the fragments is attained (Fig. 3,B). The pin is now ready to support the jaw when it receives an overlying immediate iliac crest or rib graft (Fig. 3,C and D) or to retain the fragments in their correct position when the soft tissues are closed without grafting. The nut and washer device is such that it inhibits rotation or displacement of the splint since all the muscle forces attached to the mandible tend to compress or collapse the fragments and thereby hold the splint in place.

Since the appliance is made of stainless steel, corrosion, sterilization and tissue tolerance are not a problem. The dimensions of the appliance are so minimal that it will readily accept an overlying bone graft of any nature and is never sufficiently bulky or sharp to cause the surrounding tissues to slough (Fig. 4).

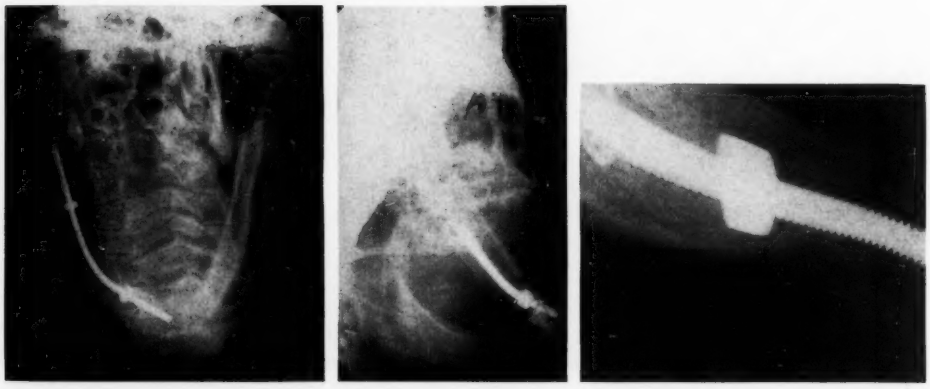

Fig. 4—Left: Anteroposterior view two years after hemiresection of mandible restored with indwelling splint and immediate bone graft. Center: Lateral view of same patient. Right: Intraoral view of splint. Note excellent consolidation of bone graft (left) two years postoperative

Fig. 5—Left: Anterior view illustrating preservation of normal facial contour. Right: Lateral view of operative site

The facility of its removal when desired is remarkable. Little more than a stab wound is required over the central portion of the wire. Dissection is carried down to the pin and a small area is exposed. The appliance is then severed with heavy wire cutters and the two pin ends are dislodged from their respective bony segments and are withdrawn through the incision. This is a short procedure which is uncomplicated and relatively atraumatic.

Care must be taken not to insert the appliance into fragments that are either diseased or so thin that they will not support the pin against future muscle traction. The original pins we used were not threaded and did not have a stop on them. As a result many of them subsequently pushed their way through soft tissues and bone to emerge eventually through the skin. The present appliance eliminates this possibility because the nut and washer provide a stop. However, if the bone which is to receive it is too thin and the hole is close to the medial or lateral surfaces, the end of the pin may erode through the bone laterally or medially and engage the soft tissues. The failures we have noted have all been based on this factor.

When one of the fragments is too small or too thin, it is wise to avoid the use of an intramedullary pin and merely wire the graft as securely as possible to both receptor fragments or to allow the superior fragments to assume its own position. If teeth are available they should be ligated; if not, a light supporting dressing should be used for two weeks and the patient should be cautious in use of the jaw for several months. One significant advantage of the indwelling pin is that it adds strength to the graft segment and not only immobilizes the fragments but also strengthens and supports the graft for the future.

The appliance as described is a device which can be used quickly, easily and effectively to retain mandibular segments in their correct anatomical relationships after partial resection of the jaw (Fig. 5). It may be left in place permanently as it is tolerated indefinitely by the tissues.

Presented at the meeting of the American Society of Oral Surgeons, Chicago, August 2, 1958.

From the department of oral surgery, Henry Ford Hospital.

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■ EDUCATION AND THE PEOPLE

Education makes a people easy to lead but difficult to drive; easy to govern but impossible to enslave.—*Lord Brougham.*

Oral carcinoma: some clinical diagnostic problems with early lesions

■ *Louis J. Loscalzo,* D.D.S., and Martin I. Ames,† D.D.S., Bronx, N. Y.*

In the past 30 months, 11 cases of unsuspected oral malignancies have been discovered by the dental service of the Veterans Administration Hospital, Bronx, N.Y., of which 5 cases are reported. Four were superficial epidermoid carcinoma and seven were carcinoma in situ. All patients were men in the sixth and seventh decades with a background of excessive alcoholic intake and nutritional deficiencies. All mucosal changes should be recorded, photographed and evaluated. The ideal biopsy procedure for such lesions is complete excision.

Carcinoma may take many forms and often appears benign, particularly in its incipient stages. The cervix was perhaps the first organ which contributed data for such an observation. Frequent periodic gynecological examinations afforded an opportunity for close study of the earliest detectable changes in the lining mucosa. The dentist is the most likely member of the health team to follow similar changes in the oral cavity at regular intervals, and thus also assume the responsibility to record and report the more subtle observations regarding the subject of oral carcinoma.

Gynecologists named this earliest known carcinomatous lesion carcinoma in situ and often found that its appearance failed to arouse the clinician until the histopathological examination had been made.

Carcinoma in situ, as an entity, was found in the cervix and described as early as 1907 by Schauenstein,[1] and by Pronai in 1908.[2] In 1926 Schiller[3] emphasized its importance as a forerunner of the classically malignant lesion previously designated as true cancer.

Carcinoma in situ may be defined as "a lesion in which the entire thickness of the squamous epithelial layer is replaced by cells microscopically indistinguishable from those of frank invasive carcinoma, with complete loss of stratification, but with no invasive penetration of the basement membrane."[4] It may also be referred to as incipient carcinoma, intramucosal carcinoma, intraepithelial carcinoma, noninvasive potential carcinoma, Bowen's disease, or Bowenoid changes.[5]

It must be mentioned, however, that invasive carcinoma will not always be the final outcome of untreated carcinoma in situ. In fact, some have reported cases to support the opinion that such a lesion may totally regress.[6]

This paper will attempt to emphasize the frequent occurrence of carcinoma in situ within the oral cavity and to report representative cases of oral carcinoma lacking some of the usual clinical diagnostic signs.

During the past two and a half years

the dental service of the Veterans Administration Hospital, Bronx, N. Y., has discovered 11 cases which would properly fall into the category of unsuspected malignancies. Of these, four were superficial epidermoid carcinoma and seven, carcinoma in situ. The entire group of patients, men in the sixth and seventh decades, revealed a definite background of excessive alcoholic intake, with cirrhotic changes in eight and nutritional deficiencies in all.

■ *Case 1*

A 60 year old white man reported to this hospital on follow-up. During his previous admission, three months earlier, a 2 by 2 cm. leukokeratotic area in the right mandibular sulcus had been totally excised and found to be carcinoma in situ.

He now appeared again with a white mucosal change within the aforementioned region, and with similar changes throughout the greater portion of the oral mucosa, the more significant being distributed as follows:

1. Site of previously diagnosed carcinoma in situ (Fig. 1, above).
2. Superior lip (Fig. 1, below left).
3. Inferior lip.
4. Left posterior maxillary alveolar crest and mucobuccal fold.
5. Left side of the mandibular alveolar crest and mucobuccal fold (Fig. 1, below right).

Biopsy sections from these regions

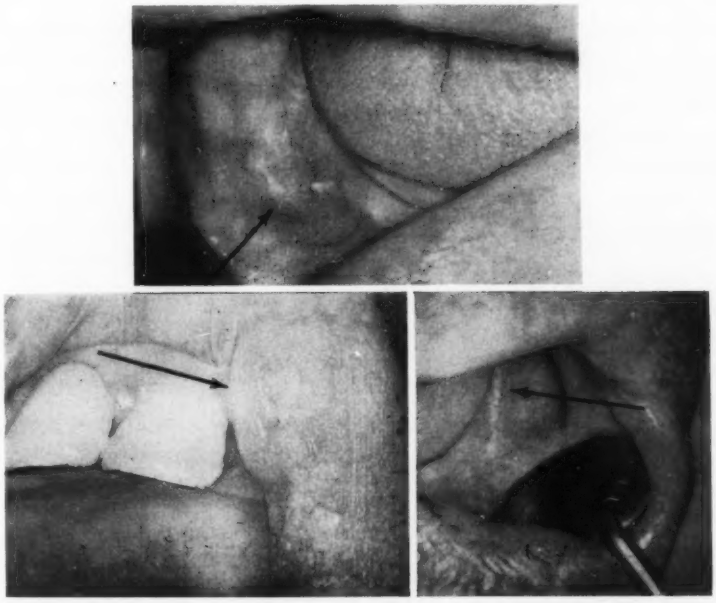

Fig. 1—Case 1. Above: Beginning of mucosal change three months after excision of carcinoma in situ. Below left: Bulbous thickening of superior lip. Below right: Leukoplakia on left side of alveolar crest

Fig. 2—Case 2. Epidermoid carcinoma on left side of mandibular ridge

were excised through their full mucosal depth and yielded the following histopathological diagnoses:

1. Leukoplakia (precancerous).
2. Pachyderma.
3. Leukoplakia (precancerous).
4. Pachyderma.
5. Leukoplakia (precancerous).

Complete dentures were constructed for this patient, a method used by some in treating generalized leukoplakia. This, however, merely aggravated the intensity of change.

Vitamin A blood level determinations were obtained and found to be 220 gamma per hundred cubic centimeters of blood. Nevertheless, a six week course of high vitamin A therapy was prescribed, but with no visible effect.

The patient at this time remains asypmtomatic as before. Those areas of excision which were left to granulate by secondary intention are now fully covered by a similarly white, slightly thickened mucosa.

■ *Case 2*

A 53 year old white man was seen by the dental service for a routine examination. He had a generalized leukokeratosis of the oral mucosa not particularly suggestive of any premalignant change, with the possible exception of the left lateral border of the tongue. Notwithstanding, several sites for biopsy were selected:

1. A papilloma on the superior lip.
2. A section resembling a smoker's patch or lichen planus on the right side of the palate.
3. A white patch on the left side of the mandibular ridge. It was not generally significant, but unlike the others, it was sharply demarcated by a red inflammatory line (Fig. 2).
4. A section on the left lateral border of the tongue.

The diagnoses based on the histopathological examinations were reported as:

1. Squamous papilloma.
2. Hyperkeratosis.
3. Epidermoid carcinoma—superficially infiltrating.
4. Hyperkeratosis.

This patient was referred for wider excision of the epidermoid carcinoma on the left side of the mandibular ridge.

■ *Case 3*

The patient, a 60 year old white man, on routine dental examination, had a distinctly raised 2 by 2 cm. white patch, located in the posterior part of the left

cheek and mandibular sulcus extending toward the soft palate. In the center of the lesion was a shallow ulceration, several points of which were being traumatized during mastication. He had chewed tobacco on this side for many years.

All the maxillary and the posterior mandibular teeth were extracted because of advanced, irreversible periodontal changes, while at the same time the entire lesion was excised down to muscle layer. The histopathological examination revealed leukoplakia.

One month later, though the wound was completely healed by secondary intention, there were again signs of leukokeratotic change (Fig. 3, left), and the lesion was excised. The pathologic report on this occasion was "chronic nonspecific inflammation with epithelial hyperplasia."

Four months later on routine follow-up, the one recurring lesion at the original site was barely perceptible. However, on removal it proved to be carcinoma in situ (Fig. 3, right).

■ *Case 4*

A 65 year old white man appeared at the dental service with a linear crevice on the inner aspect of the superior lip which he described as a "cold sore" (Fig. 4, left). He had noticed it for several weeks and felt it might have been caused by a faulty denture.

Clinical examination favored the impression expressed by the patient. Its margins were soft and its appearance unremarkable; total excision proved otherwise. It was a superficially infiltrating epidermoid carcinoma.

■ *Case 5*

A 69 year old Negro man was referred for evaluation of an extensive, raised, indurated and centrally ulcerated patch in the right buccal mucosa and lateral soft palate (Fig. 4, right). Unlike those in the other cases reported, the lesion appeared to be precancerous. Total excision and histopathological examination proved it to be hyperkeratosis with

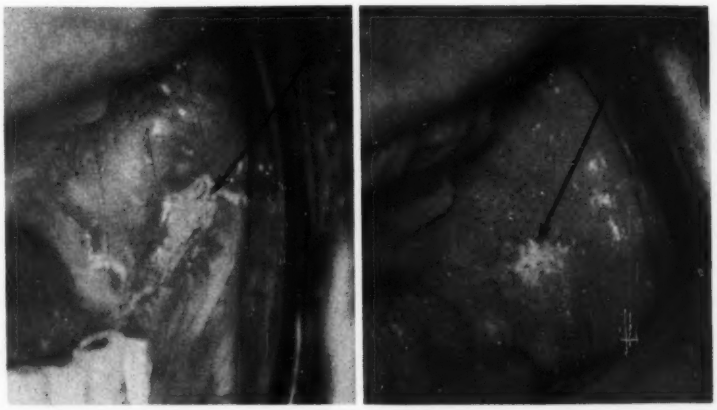

Fig. 3—Case 3. Left: Chronic inflammation. Right: View four months later showing carcinoma in situ

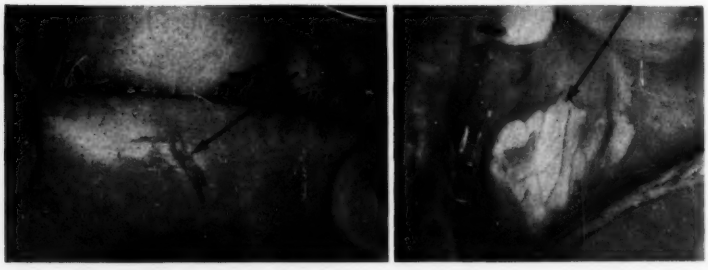

Fig. 4—Left: Case 4. Epidermoid carcinoma on upper lip. Right: Case 5. Hyperkeratosis on right cheek

benign epithelial hyperplasia and chronic inflammation. Nevertheless, in view of past experiences, this patient will warrant a persistent follow-up.

■ *Discussion*

The idea that neoplasms arise suddenly is being reappraised by many investigators. Recent studies have shown that malignancy may begin by altered local physiological conditions before it becomes clinically apparent.[7] The oral cavity appears to be a satisfactory area for close clinical observation and repeated biopsy. Thus it would seem that it can be demonstrated that a carcinoma may start as a minute focus of dysplasia of the squamous epithelium affecting not an individual cell, but rather a small constellation of cells which may be scattered throughout a given region.[8]

■ *Conclusion*

The conclusions drawn from this report of five cases are as follows:

1. All mucosal changes must be re-

Fig. 5—Left: Leukokeratotic changes. Right: Site of multiple excision of tissue for biopsy

corded, photographed and fully evaluated.

2. Evaluation should include a medical consultation regarding the patient's general physical and nutritional status. Regardless of the histopathological diagnosis, a follow-up is usually necessary especially when the predisposing factors of age, site, nutrition and so forth are present.

3. The ideal biopsy procedure for such lesions is complete excision wherever possible. Figure 5, left, illustrates multiple areas of leukokeratosis appearing on the lateral border of the tongue, floor of the mouth and the mucobuccal fold. Figure 5, right, represents the immediate post-surgical wound after what was considered to be adequate removal of tissue for biopsy.

4. The pathologist should be informed as to the clinical potential of each case and serial sections accordingly requested.

5. A generalized mucosal change demands the removal of multiple, selective and properly delineated biopsy sections, for it must be remembered that oral carcinoma may be multicentric and that not uncommonly carcinoma in situ is found adjacent to frank carcinoma.

6. Repeated biopsy in the oral cavity is a simple office procedure which is relatively inconsequential to the patient, and affords minimal postoperative sequelae.

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†Career resident in oral surgery, Veterans Administration Hospital.

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■ Infectious Mononucleosis

Although infectious mononucleosis has been recognized as a clinical entity for at least 67 years, following the clinical description by Pfeiffer in 1889, and even though the hematologic picture was accurately characterized 23 years ago by Downey and McKinley and by Tidy and Daniel simultaneously, identifying the lymphocyte as the cell form involved, the causative agent of this disease has not yet been identified. It is axiomatic that specific treatment of a disease is rarely possible without first identifying the causative agent. It is therefore likely that treatment of infectious mononucleosis will remain on a symptomatic basis until the etiologic factor is identified. Although there is rather uniform agreement among researchers in this field that the causative agent is a lymphotrophic virus, this has by no means been proved. Under the limitations of these circumstances, therefore, the important advances in treatment of infectious mononucleosis have been confined to management of the complications.—*B. K. Wiseman, The Treatment of Infectious Mononucleosis, J. Chronic Diseases Oct. 1957.*

Intelligent consent for treating subcondylar fractures in children

■ *Marsh Robinson, D.D.S., M.D., Santa Monica, Calif.*

To avoid misunderstandings between parents and the surgeon regarding future jaw function and any possible difficulties, the author proposes the use of a diagrammatic sketch which should be countersigned by a parent prior to active treatment of a condylar fracture. In this way, the possibilities of future dysfunction, ankylosis and additional surgery will be understood, acknowledged and witnessed, thereby eliminating possible misunderstanding and subsequent litigation.

A California District Court of Appeal stated "A physician violates his duty to his patient and subjects himself to liability if he withholds any facts which are necessary to form the basis of an intelligent consent by the patient to the proposed treatment."[1]

■ *Medico-Legal Aspects*

Every oral surgeon who treats subcondylar fractures in children must give some thought to the medico-legal aspects of such treatment. Jeopardy of malpractice extends for various periods of time in different states after the child patient has reached majority. The serious sequelae of such an injury in a child make it most important to obtain an intelligent consent from the parents. As most lawsuits start as a result of misunderstanding, this article will present a method of establishing a background for consent to treatment.

As fracture treatment consists of reduction and immobilization, both phases of treatment need explanation. There is no satisfactory means of obtaining a closed reduction in a fracture dislocation. If a closed procedure is to be used, the reasons must be explained fully. There can be a question of malpractice due to omission as well as commission.

The inability of the surgeon to perform an open operation on a child's subcondylar fracture is not an indication for a closed procedure. The only valid arguments for a closed type of procedure are the size and the location of the fractured condylar fragment. If fraud is involved, some court decisions have made exception to the general rules and declare that the statutes of limitation do not commence to run until the patient has learned the facts which were concealed.

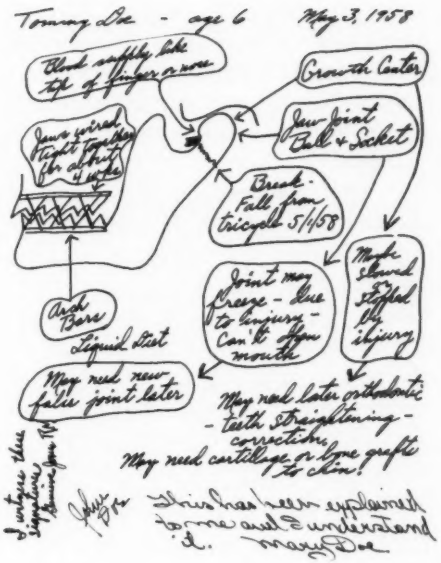
The protection against malpractice suit is actually only a small part of the problem. The object of this paper is to point out the fact that impairment of joint function can and does occur as a result of subcondylar fractures. The idea held in some quarters that conservative treatment of these injuries always eventuates in excellent results is not true. The practitioners that deal with the later difficulties wish

that the original surgeon had prepared the parents for the additional necessary treatment.

■ *The Record*

The most simple visual aid is a pen and paper. The parents should be seated at eye level with the oral surgeon, preferably with no desk intervening. The diagram, no matter how crude, is better than a polished lecture. The very act of working out the sketch together and the honest searching for lay terms of explanation establishes a good rapport with the parents (illustration).

The date and patient's name are written, and then the dentist will begin a drawing which shows a mandible and the fracture that the child has sustained. As the drawing is made to explain the surgical anatomy, appropriate notes are made in the margins. All explanations and notes should be made in lay language. The blood supply to the condyle, as an end organ, is compared to the more familiar tip of the finger, nose, or ear. The condyle should be heavily outlined, arrowed and given the title of principal growth center. For these reasons it should be written in the record that the treatment will be, for example, "a closed reduction and immobilization for four weeks." Now the parents must be told that the injury might result in loss of growth and development of the right jaw. Also the injury could result in ankylosis or "a freezing" of the joint so that opening would be impossible. Also, this may require later orthodontic treatment and possibly cartilage or bone grafts to the chin. This record should be made in the presence of both the mother and father and a witness. After the record


Tommy Doe - age 6
May 3, 1958
Blood supply like tip of finger or nose
Growth Center
Jaw-Joint Ball + Socket
Jaws wired tight together for about 4 wks
Break - Fall from tricycle 5/1/58
Joint may freeze - due to injury - Can't open mouth
Maybe skewed stifled by injury
Arch Bars
Liquid Diet
May need new false joint later
May need later orthodontic - teeth straightening - correction
May need cartilage or bone graft to chin
I witness this signature
This has been explained to me and I understand it.
Mary Doe

Sample of diagram

is made it should be given to the parents who will write in their own handwriting "this has been explained to me and I understand it." The witness than writes "I witness this signature" and signs. If this is done in the hospital, it is best that a carbon copy be made and this carbon copy kept in the office with patient's record.

The diagram has the drawback of being in two dimensions whereas the explained facts are in three. It is helpful during the drawing to set the pen aside and use one open hand to represent the fossa with the fist of the other as the condyle. If a fracture dislocation has occurred, the wrist can be bent to demonstrate this to the parents. Photographs and slides have not been found satisfactory by the author. If instances of successful treat-

ment are shown the parents, there may be an implication of guarantee of results. Occasionally photographs or slides can be used to reassure a hysterical mother that her child does have a chance of not being a cripple.

The roentgenograms should be shown the parents but they are difficult to interpret, even for experts. If a surgeon sees many such patients, it is valuable to alter a plastic skull for demonstration. The author has found no resistance to the parents handling the realistic model when told it is "plastic." Two mandibles can be obtained for the same plastic child's skull, and the types of subcondylar fractures simulated with self-curing acrylic resin.

The parents should be made to understand that the results of injury to growth and development will not be evident for several years. They may be reassured that today there are methods of correcting defects in form and function if they should occur.

The better the parents can be made to see the problems involved, the better will be their "intelligent consent" for treatment. It is always wise not to accept this responsibility alone. An independent consultant should be called in.—*3003 Santa Monica Boulevard.*

Professor of oral surgery, University of Southern California School of Dentistry; clinical professor of oral surgery, University of Southern California School of Medicine, Los Angeles.

1. Editorial. Bull. Los Angeles Co. Med. Association, March 6, 1958.

■ Purple Reptile Fossils

An uninhabited desert valley in the west central region of Argentina, strewn with purple-colored fossil bones of creatures that lived about 170 million years ago, is being investigated by scientists of Harvard University. They call it "one of the greatest fossil fields of the world." The valley, about 12 miles long, was discovered by the members of an expedition of the university's Museum of Comparative Zoology. The fossils, covered by a purple matrix containing iron compounds, lie loose on the surfaces or are partially embedded. Some of the specimens belong to an extinct species of reptiles having features only observed in mammals. This group is known as Cynodonts which looked like a cross between a lizard and a dog. In these four-footed carnivorous animals, the structure of the skull, especially of the jaws and teeth, and other parts of the skeleton, is of a type that lies between primitive reptiles and mammals. Some anatomic features lead paleontologists to believe that these reptiles were warm-blooded. Fossils of another extinct reptile species, Dicynodonts, were also discovered. These were a specialized group of herbivorous animals of the direct evolutionary type leading to primitive mammals. They had long tusklike canine teeth and a horny beak.—*Alfred S. Rohmer and Bryan Patterson, The Valley of Purple Fossils in Argentina. Science Digest 45:42 March 1959.*

Postoperative edema and its reduction by trypsin

■ *Paul Schneider, D.D.S., New York*

In a double blind study involving 100 selected patients undergoing oral surgical procedures, the degree of postoperative swelling was reduced to a third or less when trypsin was used, as compared with the control group that received the placebo injections. The trypsin preparation contained 5 mg. of the enzyme dissolved in 1.0 ml. of a 5 per cent gelatin menstruum. Four injections were administered in the deep gluteal regions in rotated quadrants. No untoward effects were noted.

A therapeutic agent which reduces postoperative edema would be a valuable addition to the armamentarium of the oral surgeon. This report covers the clinical evaluation of trypsin, a proteolytic enzyme, as an agent to alter the inflammatory process encountered in oral surgical procedures.

After surgical intervention, simple inflammatory edema becomes evident in the adjacent tissues as the result of injury to the underlying structure. There is immediate hemorrhage from the incised, lacerated, torn or crushed blood vessels, from, into and about the wound. The presence of blood in the intercellular spaces excites an outpouring of serum as if to dilute this extravasated blood. As oral surgical procedures frequently involve bone as well as soft tissues in regions that are not readily accessible, manipulation is commonly more than minimally traumatic, and the resultant inflammatory response may be pronounced. There is obstruction in the free flow of lymph and venous blood which results in edema and venous engorgement.

With stasis of lymph and venous blood in a wound, the efficiency of healing is impaired. The delay in wound healing and in the process of granulation tissue formation is a product of inadequate blood supply imposed by restricted circulation. Local metabolism is retarded, and conditions develop which favor bacterial growth.

Though the swelling associated with oral surgical procedures is seldom of sufficient magnitude to effect noticeable changes in healing or resistance to infection, it is encountered with sufficient frequency to be both vexing to the surgeon and unpleasant to the patient. Swelling of the face after odontectomy is to be expected, especially if the procedure is difficult. The swelling usually occurs over the outer surface of the jaw and is most pronounced in the region of the masseter muscle. The degree of swelling varies with operative technic, but all traumatic procedures cause some reaction. Certainly productive time lost by the patient can be correlated, at least in part, with the amount of edema and pain resulting from the operation.

Investigative trends have recently been directed toward finding a suitable agent for reducing edema. Antihistamines,

corticosteroids, adrenocorticotropic hormones, hyaluronidase and so forth have been evaluated, but to date no drug has proved sufficiently effective or safe to warrant its general usage.

Trypsin was selected as an antiedema agent for study because recent investigation has suggested that it exerts a profound effect on the prevention and reduction of inflammation. An extensive review of the laboratory and clinical background of trypsin was undertaken. For the sake of brevity, this section has been eliminated. A list for selected reading is included in the bibliography for those who wish to examine the literature. Some of the listed papers were not available at the time this work was done.

Laboratory data showed that pretreatment with trypsin for prevention of edema was more effective than postoperative treatment for reversal of edema. There is some clinical confirmation, but no planned surgical study has been reported. A salutary effect on wound healing has been reported. The exact mechanism by which trypsin exerts its effects has not been elucidated.

No significant changes in blood factors have been seen except with high doses given intravenously. When trypsin was given intramuscularly, pain was reported frequently and there were some allergic reactions, usually local in nature. In all the cases reported prior to the inception of this study, the intramuscular trypsin was given in an oily menstruum. In this study a gelatin solution in water was used because this has been found by the manufacturer to be less painful, more active, and generally a more suitable method.

■ *Materials and Methods*

The study was undertaken with 100 selected patients admitted for the surgical removal of impacted teeth or for multiple extractions including alveolectomy in the oral surgery service of the University of Pennsylvania Hospital. Only patients admitted by the chief and associate chief of the service were included. This was done to insure as high a degree of standardization in operating technic as is possible in a field of surgery where great variability exists. On admission all patients received routine hematological examination (hematocrit, hemoglobin, white blood cell count, bleeding time and clotting time) and urinalysis, as well as a complete physical examination. Patients manifesting gross pathologic or physical abnormalities or deviating from normal in blood or urine studies were excluded. The study was conducted on a double blind basis, that is, neither the surgeons nor the patients knew when the active drug or the placebo was given.

COMPOSITION OF SAMPLE—In all, 100 patients were selected; 30 were male and 70 were female. Their ages ranged from 11 to 68 years, with an average of 31 years. The same average age pertained for the men and for the women.

METHOD—One half of this group received trypsin administered in a gelatin menstruum; the other half, a control group, received only the menstruum. At no time during the course of the study were the patients or the surgeons aware of which preparation was being administered. This was accomplished by placing the substances for administration in similar vials

Table 1

Composition of sample according to surgical procedure and treatment

Surgical procedure	No. of patients			
	Surgeon A		Surgeon B	
	Trypsin group	Placebo group	Trypsin group	Placebo group
Single mandibular impactions	1	4	3	2
Single maxillary impactions	2	0	0	0
Bilateral mandibular impactions	3	1	2	4
Bilateral maxillary impactions	0	0	0	0
Four third molar impactions	14	16	5	6
Combinations of impactions	3	2	2	0
Extractions and other impactions	9	11	6	4
Total	32	34	18	16

bearing labels marked "Oral Surgery Preparation No. 2" and "Oral Surgery Preparation No. 3." At intervals during the course of the study the numbers were changed to minimize the possibility of the surgeon's forming preconceived ideas of the preparations.

Patients were so selected as to have equal numbers undergoing similar operative procedures in the group receiving trypsin and in the control group receiving the placebo. This was done to limit inequality of composition in the two groups and insure as fair and accurate a comparison as possible where great variability of procedures exists. This is seen in Table 1.

Only those patients suitable for a selected standard preoperative and postoperative medication were used. The medication was in accordance with the accepted principles of treatment for routine oral surgical procedures (Fig. 1). This was done to eliminate the possibility of variation of effect produced by variation in medication and procedure.

All operations were performed with the patient under general anesthesia. Induction was accomplished with intravenous thiopental sodium, and intubation followed intravenous administration of succinylcholine chloride. Maintenance was achieved with nitrous oxide, oxygen and ether administered through the naso-endotracheal tube.

The trypsin preparation contained 5 mg. of the enzyme dissolved in 1.0 ml. of a 5 per cent gelatin menstruum. This was injected in the deep gluteal regions in rotated quadrants. The placebo was 1.0 ml. of the 5 per cent gelatin similarly injected. Four injections were administered: the first, the evening of the preoperative day; the second, one hour prior to surgery; the third, the evening of the operative day, and the last at 8:00 A.M. the first postoperative day.

EVALUATION OF SWELLING — Two methods were used to evaluate the swelling:

1. The surgeon was asked to render a clinical impression of the amount of trauma at operation and the postoperative swelling on the succeeding morning. The procedure was classified as either complicated or uncomplicated; these terms were

Date	Treatment	Diet
	Routine oral surgery hematological examination	
	Urinalysis	
	Procaine penicillin in aqueous suspension, 300,000 units	House diet
Admission day	Ascorbic acid, 300 mg.	
	Oral surgery preparation (placebo or trypsin), 1 cc. intramuscularly at bedtime	
	Pentobarbital sodium, 100 mg. at bedtime	
Operative day		
	Pentobarbital sodium, 50 mg. at 6:00 A.M.	
	Meperidine hydrochloride, 50 mg. at 7:00 A.M.	
Preoperative	Scopolamine hydrobromide, 0.04 mg. at 7:00 A.M.	Nothing by mouth after midnight
	Oral surgery preparation (placebo or trypsin), 1 cc. intramuscularly at 7:00 A.M.	
	On call at 7:30 A.M.	
Operation		
	Vital signs every half hour until stable	
	Ice to face	
Postoperative	Bismuth paste to lips	Force fluids
	Oral surgery preparation (placebo or trypsin), 1 cc. intramuscularly at bedtime	Soft diet after 5:00 P.M.
	Procaine penicillin in aqueous suspension, 300,000 units orally	
	Ascorbic acid, 100 mg. three times a day	
	Codeine, 30 mg. every four hours as necessary	
	Pentobarbital sodium, 100 mg. at bedtime as necessary	
	Ambulatory	
Postoperative day	Milk of magnesia, 30 cc. on rising	
	Liquor alkalinus antisepticus	
	Oral surgery preparation (placebo or trypsin), 1 cc. intramuscularly at 8:00 A.M.	

Fig. 1—Treatment sheet

used to reflect an index of the amount of trauma incurred. The postoperative swelling was recorded as minimal, average, or extensive, in terms of what would have been expected from the degree of trauma. The surgeon again evaluated the swelling, usually on the fourth to sixth day in a postoperative follow-up.

2. Caliper measurements were made of the face at the anterior border of the masseter muscle the preoperative day on admission and again on the morning of the first postoperative day. Measurements of each patient were made by the same resident before and after surgery at the same site. The difference was considered an index of the swelling. Care was taken to minimize contact of the caliper arms to the face. This site was used for the measurement as it most commonly represented the area of greatest swelling.

■ *Response to Therapy*

Evaluation by the two methods is seen in Tables 2 and 3.

The average swelling from procedures considered complicated was 0.79 cm. for those given the placebo against 0.22 cm. for those receiving trypsin.

The average swelling from procedures considered uncomplicated was 0.49 cm. for those given the placebo against

Table 2

Evaluation of postoperative edema by observation on following morning

Swelling	No. of patients					
	Surgeon A		Surgeon B		Total	
	Trypsin	Placebo	Trypsin	Placebo	Trypsin	Placebo
Minimal	27	13	14	8	41	21
Average	4	16	3	3	7	19
Extensive	1	4	1	5	2	9

0.12 cm. for those receiving trypsin.

Thirteen of those patients who received trypsin and in whom the surgical procedure was considered excessively traumatic had minimal swelling, whereas only three of the patients receiving the placebo had swelling which was considered minimal.

The number of patients receiving trypsin in whom the surgeon considered the swelling remarkably minimal, considering the trauma inflicted, was seven, as compared with two receiving the placebo.

It may be noted that, in general, the swelling encountered in the trypsin group was usually less than anticipated, whereas this was only an exceptional observation in the placebo group (Table 4).

COMPLICATIONS — No complications were encountered in any of the 100 patients, whether treated by trypsin or placebo. When there was excessive trauma, patients were held in the hospital for an additional day as a precautionary measure.

TEMPERATURE — Because of the febrile response to enzyme treatment that has been reported in the literature, each patient's temperature was recorded on admission and on the morning of the first postoperative day. The febrile response in the group treated with trypsin was from 98.2°F. to 98.8°F., an average of 0.6°F. as compared with a fluctuation of 98.2°F. to 99.0°F. for an average of 0.8°F. for the control group.

Complete temperature charts were recorded for each patient and are represented in Figure 2. The chart shows the average temperature for all patients at each reading from the time of admission to the morning of the first postoperative day in the unbroken line, and the highest reading for any patient at each specific time in the broken line.

In no instance was there a febrile response severe enough to evoke the familiar pattern of chills and so forth.

PAIN—The amount of codeine requested by the patients was considered a

Table 3

Evaluation of postoperative edema by increased increments

Surgical procedure	Edema (cm.)					
	Surgeon A		Surgeon B		Total	
	Trypsin	Placebo	Tryspin	Placebo	Trypsin	Placebo
Complicated	0.23	0.71	0.19	0.98	0.22	0.79
Uncomplicated	0.09	0.37	0.17	0.71	0.12	0.49

Table 4

Evaluation of postoperative edema by observation on fourth to sixth postoperative day

Swelling	No. of patients					
	Surgeon A		Surgeon B		Total	
	Trypsin	Placebo*	Trypsin	Placebo	Trypsin	Placebo
Minimal	27	22	17	10	44	32
Average	5	11	1	4	6	15
Extensive	—	—	—	2	0	2
					50	49

*One patient returned to his out-of-city home and could not return for follow-up.

criterion of subjective pain, since the orders were written *pro re nata*. The average codeine consumption by the two groups was 20 mg. for the group treated with trypsin, as compared with 26 mg. for those in the placebo group. Twenty-four in the trypsin group took no codeine, compared to 22 in the placebo group. This is not considered significant.

HEMORRHAGE—There was no incident of abnormal, uncontrollable bleeding.

LENGTH OF HOSPITALIZATION—The average hospitalization stay for the two groups was about the same. Patients were usually held an additional day if the trauma of the procedure was considered

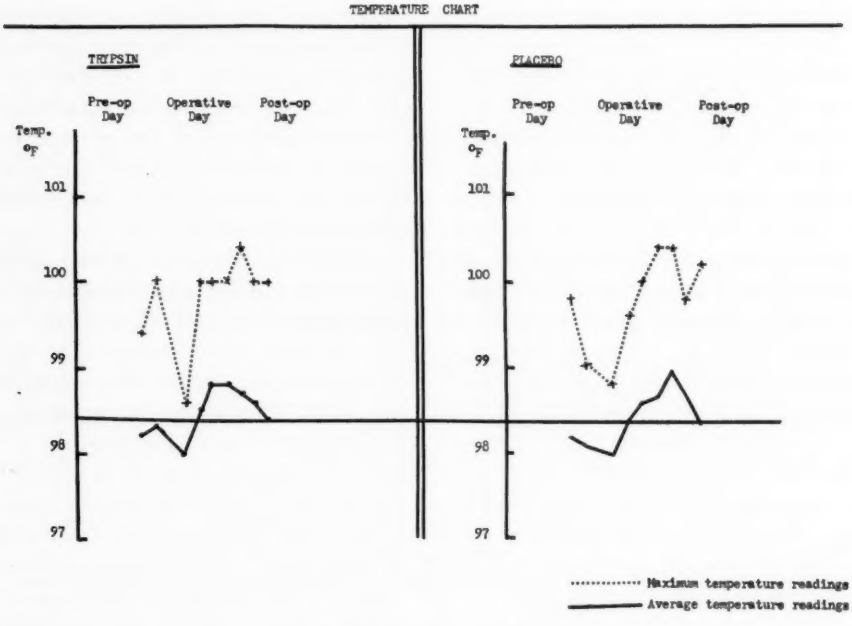


Fig. 2—Temperature chart

excessive in the surgeon's opinion. No attempt was made to discharge any patients before the first postoperative day.

PAINFUL INJECTION—Preparations of this type have been notoriously painful at the injection site. This has been observed by a number of investigators. These reactions were obtained when an oily menstruum was used for the trypsin. The gelatin used here was designed specifically to reduce pain. Comparison was made between the trypsin in gelatin and the gelatin menstruum alone. There were no remarkable differences in the number of complaints regarding pain of injection from the groups receiving the trypsin as compared with those getting the placebo. This is admittedly difficult to evaluate because of the extreme anxiety of some patients receiving injections of any type. Some nurses thought that some patients complained more of the injection of trypsin than of the control, but these were random expressions which were not evident or consistent for the group.

■ *Conclusions*

Trypsin is a useful adjunct for the reduction of postoperative edema after oral surgical procedures. The fact that it beneficially affects edema does not suggest that sound surgical principles for the minimization of edema should be abandoned. When, however, edema is an unavoidable consequence of indicated, extensive surgical manipulation, trypsin may play a role in facilitating recovery.

It is not recommended for routine use because of the inconvenience of administration, the occasional painful injection, and the expense to the patient. However, in those difficult instances in which extensive swelling is anticipated by careful preoperative diagnosis and evaluation of the patient, its use is strongly recommended. It is an apparently effective agent in the control of the inflammatory process. It is extremely difficult to submit to analysis with statistical significance the advantages or disadvantages of a drug to modify postoperative swelling because of the wide range of variation of patients, surgeons, surgical procedures and anesthesia involved in any single type of procedure.

■ *Summary*

Trypsin in a gelatin menstruum was included in the preoperative and postoperative preparation of a group of patients. The postoperative edema in this group was compared with that in a control group not receiving trypsin. The discussion set forth in this study is based on the clinical experience with 100 selected patients undergoing oral surgical procedures ranging from exodontia with alveolectomy to multiple odontectomy. Although trypsin is no "wonder drug," its ability to reduce postoperative edema has proved of value in the series reported here. The degree of swelling was reduced to a third or less when trypsin was used as compared with the matched group that received the placebo injections. There were no untoward effects seen in any patients.—*420 East Fifty-fifth Street.*

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From the oral surgery service, Pennsylvania Hospital, Philadelphia.

The trypsin (Parenzyme Aqueous) used in this investigation was made available by the National Drug Company.

■ Munchausen Syndrome

Patients who visit physician after physician, dentist after dentist, and travel from hospital to hospital faking startling symptoms may have the strange mental condition called "Munchausen syndrome." It was an English physician who somewhat facetiously first supplied this term to such problem patients because their continuously changing physicians, dentists and hospitals and their fanciful histories are reminiscent of the fictional character, Baron Munchausen. Although this condition has been frequently reported in Europe, the first American case report appeared recently. The patient, a 39 year old merchant seaman, entered the clinic of a university hospital with blood splattered over his shirt in 1954. He kept the staff in a state of turmoil with his behavior. He demanded immediate elaborate treatment but became increasingly uncooperative and disturbed. It was later found that he had been in at least 16 hospitals between 1943 and 1954. The patient was able to fake external hemorrhages; he seemingly enjoyed the consternation evoked by his blood-spattered appearance and played upon the sympathy of the interns and residents. He submitted to treatment only after much argument. Just why patients with the Munchausen syndrome act that way is not known. They may get enjoyment from the dramatic role they play or may harbor a grudge against physicians and dentists and resort to this behavior to get even. Some may desire drug administration. By the time, however, the Munchausen syndrome has been established, the patient is a candidate for a mental institution, even if he has a true physical disease which produces some of the symptoms.—*John S. Chapman, J.A.M.A. 1958.*

VOLUME 17 • MAY 1959 • NUMBER 3 CASE REPORTS

Herpes zoster of the mandibular division of the trigeminal nerve: *report of a case*

■ *John Paul Jarabak, D.D.S., Camp Lejeune, N. C.*

Herpes zoster is an acute inflammatory disease of the cerebral ganglia and ganglia of the posterior nerve roots, which is caused by the virus of chickenpox *(Briareus varicellae)* which is both dermotropic and neurotropic. It is characterized by groups of small vesicles on inflammatory bases occurring in the cutaneous and mucous regions supplied by certain nerve trunks and associated with neuralgic pain. The pain is described as a lancinating pain with hyperalgesia over the skin or mucous membrane surfaces supplied by the affected roots.

Perlo[1] has stated that if the inflammatory process spreads to involve adjacent motor roots, a segmental motor weakness and atrophy may develop. A partial paralysis of the masticatory nerve may develop in conjunction with a gasserian ganglion involvement, as was experienced by the patient in the case reported by Perlo.

Klauder[2] reported that herpes zoster may occur after the incidence of oral trauma. He cited one instance in which a patient experienced trauma in the surgical removal of two rudimentary teeth of the mandible and three weeks later herpes zoster of the mandibular division developed on the same side. The patient in the case reported here had had a subgingival scaling and a prophylaxis one week prior to hospitalization with no undue trauma that the patient could remember.

Herpes zoster on occasion has been associated with patients having chronic lymphatic leukemia and frequently in patients with lymphoblastoma as reported by Frank.[3] Distribution of the condition according to sex is about equal, and the age varies, as shown by de Moragas and Kierland,[4] with a greater incidence in the third and fourth decades. Also, their studies showed that the incidence of postherpetic neuralgia increased considerably in the sixth and seventh decades, whereas in patients less than 20 years of age there was no appreciable neuralgia. Leider and Contreras,[5] on summarizing 215 cases, showed that there was a slightly greater incidence of neuralgia on the right side.

Various modes of treatment have been discussed in the literature.[6] Included in the treatment during the acute phase of the condition have been acetylsalicylic acid, autohemotherapy and roentgenotherapy.[2,5] Gratifying results with immune globulin were reported by Rodarte and Williams.[7] To relieve postherpetic neuralgia, roentgen-ray therapy, cobra venom, posterior pituitary injection and Protamide, B and B_{12} vitamins, procaine and alcohol injections, avulsions of the nerves and blood vessels, and frontal lobotomy[2,5] were used. Sauer[8] reported that relief was obtained in 70 per cent of 15 cases with corticotropin (ACTH) and cortisone, and that a placebo was effective in 36 per cent of those cases.

It appears that herpes zoster in the trigeminal nerve has a poorer prognosis and a higher degree of postherpetic neuralgia than in other sensory nerves.

Left: Extraoral cutaneous lesions showing distribution of peripheral nerves. Center: Intraoral mucosal lesions showing some distribution over midline. Right: Preauricular region shows vesicles extending along face and high into temporal region

REPORT OF CASE—A 39 year old white woman, mother of three children, was first referred to the dental service at the U. S. Naval Hospital in September 1955. She had a two day history of a pain and burning sensation in the lower right side of the oral vestibule, particularly in the mental region, and in the preauricular and mandibular region of the face. She was referred for roentgenographic and clinical examination and treatment of a third molar impaction. Examination revealed multiple papulovesicular eruptions both on the oral mucosa and on the cutaneous surfaces innervated by the sensory fibers of the mandibular branches of the trigeminal nerve (see the illustration).

She had no other general symptoms but felt slightly warm and toxic. Her temperature was 99.4°F. Aspirin compound and codeine had not relieved the pain and burning sensation. Minimal lymphadenopathy was present.

The patient's history was normal except for a mild attack of chickenpox at age seven and a subgingival scaling and oral prophylaxis in the week preceding the present examination.

Chest roentgenograms, urinalysis and hematological studies were normal with a sedimentation rate of 22 (corrected). Consultation with the ophthalmology service showed no communications to the ophthalmic division of the nerve.

The course of treatment for her ten days in the hospital included emetine hydrochloride, 1 grain (one ampule) daily for seven days; cortisone, 25 mg. four times a day; cortisone ophthalmic ointment four times a day to the right eye; ethyl chloride spray to cutaneous surface lesions and 0.5 per cent tetracaine hydrochloride solution to oral mucous membrane surfaces. She was also supported by 250 mg. tetracycline hydrochloride four times a day. Pain was controlled by medication varying from ¼ grain morphine to ½ grain codeine with 10 grains aspirin.

The patient's course was extremely painful for the first two days, but as the crusting of the cutaneous lesions started, extreme pain subsided and codeine and aspirin along with ethyl chloride spray and local topical anesthetics kept her comfortable. She noted that she was unable to bite hard on her right side and did most of the chewing on the left. She periodically remarked that the right side felt as though it was partially paralyzed. She remained afebrile most of the time with an elevation of 99.5°F. at the highest recording.

By the eighth day, she was free from pain, but remarked that the burning feeling in her face persisted and that her teeth felt as though they were hitting a hot, metallic object. She was discharged with no residual cutaneous or mucous membrane scarring and with minimal discomfort. Appetite, weight and rest were normal.

A two year follow-up revealed that the patient has had no recurrence of the lancinating pain, but feels conscious of that side and protects it from exposure. The mild burning sensation still persists which requires 5 to 10 grains of aspirin daily. She continues to stress that

she does not have the chewing ability that she previously had on the right side.

COMMENT—This case illustrates that to ease the pain and discomfort and to retard postherpetic neuralgia, hospitalization and good nursing care are required in treating one of the most painful of neuralgic entities.

The opinions or assertions contained in this article are the private ones of the writer and are not to be construed as official or reflecting the views of the Navy Department or the naval service at large.

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Mixed tumor of the palate:
report of case

■ *M. R. Holland, D.D.S., M.S.D., and A. P. Chaudhry, B.D.S., M.S., Ph.D., Minneapolis*

Mixed tumors are found most commonly in the parotid and submaxillary glands. In addition, they are encountered in the oral cavity, the respiratory tract, the lacrimal glands, and the skin. In the mouth, the palate is the most frequent site of involvement by this tumor. In Ash's[1] series of 683 patients with mixed tumors, 80 of the tumors were located in the palate. According to Willis,[2] in 100 mixed tumors of the parotid glands, there are likely to be ten in the submaxillary glands and ten in the minor salivary glands, one half of which are in the palate. They usually are located lateral to the midline in the posterior region of the hard palate and often extend into the soft palate.

Mixed tumors of the palate grow slowly, remain unnoticed for a long time and seldom cause pain or any other symptoms. Because of their insidious nature they may reach a considerable size before they are treated. They may vary in consistency from firm and elastic to soft and fluctuant. They usually adhere to the underlying periosteum and may cause destruction of bone. The overlying mucosa remains intact except when repeatedly incised or traumatized.

Clinically, mixed tumors of the palate may be differentiated from the dental abscess, the mucocele or the swellings caused by the oral manifestations of such generalized diseases as lymphomas and sarcoidosis.

Mixed tumors of the palate may or may not be encapsulated, but adequate surgical removal ensures a complete cure. Radiation is of little value.

REPORT OF CASE—A 23 year old woman came to the School of Dentistry of the University of Minnesota on April 2, 1958, for a routine dental examination. Her mouth was

Fig. 1—Tumor mass extending from left first bicuspid to distal of third molar

exceptionally clean and appeared to be relatively free from caries. However, a fluctuant 3.0 by 2.5 cm. swelling was noted on the left posterior aspect of the palate extending from the region of the first bicuspid to that of the third molar. The swelling was limited to the left of the midline (Fig. 1). The patient was not aware of its presence and could not recall ever having had pain or numbness in this region. All the upper posterior teeth were vital. Roentgenograms demonstrated an irregular but distinctly outlined area of bone destruction in the region of the lesion. The medical history of the patient was essentially noncontributory. A working diagnosis of a mixed tumor or retention cyst was made.

On April 8, 1958, the patient was sedated with 0.5 Gm. of ethinamate, and under local anesthesia, an unsuccessful attempt to aspirate fluid from the swelling was made prior to the operation. A generous palatal flap was raised from the gingival margins with relaxing incisions distal to the third molar and mesial to the cuspid. A mucinous tumor mass was exposed which was invading bone and extending posteriorly into the soft palate and anteriorly to the first bicuspid region. It was separated easily from the bone, but was more intimately attached to the periosteum of the palatal flap and to the sheath of the anterior palatine nerve and vessels. By blunt and sharp dissection the tumor was freed from these structures and removed. An irregularly shaped defect in the palatal bone approximately 1 cm. deep at the deepest point was present after removal of the tumor.

As the tumor was dissected from the anterior palatine sheath, brisk bleeding occurred but subsided with direct pressure. A small section of gelatin sponge was placed at this bleeding site and the wound was then closed with interrupted silk sutures. The specimen, which was partly mucinous and partly firm in consistency, was sent for microscopic examination.

The sutures were removed five days after surgery at which time the patient was making normal progress. On April 21 the swelling was completely gone and the palatal flap appeared to be well attached around the necks of the adjacent teeth.

On May 19 the patient returned stating that she noticed a slight swelling in the operative site about two weeks previously which lasted about three days. At examination, no swelling could be detected, but a slight inflammatory reaction was present at the posterior edge of the hard palate. One week later the inflammation had disappeared and the palate looked normal.

The patient was examined again in November, 1958, and the findings were negative. Roentgenograms were made which indicated almost complete regeneration of bone in the

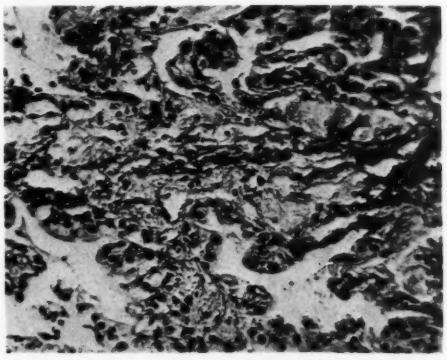

Fig. 2—Photomicrograph showing collagenous connective tissue infiltrated with epithelial cells lining irregular glandular space

palatal defect. The teeth in the region remained vital.

PATHOLOGIST'S REPORT—Grossly, there were three pieces of tissue which appeared to be fibrous in nature. The amount of tissue submitted was much smaller than the size of the lesion would indicate.

Microscopically, the bulk of the specimens were comprised of dense hyalinized collagenous connective tissue with scattered foci of inflammatory cells, chiefly the lymphocytes. Epithelial cells were present only in part of the second piece and were either scattered singly or in groups throughout the dense connective tissue stroma or were forming irregular glandular spaces (Fig. 2). There was a definite evidence of squamous metaplasia of ductal epithelium, but mucin-producing cells were absent as was evident from mucicarmin stain. Diagnosis of benign mixed tumor was made.

DISCUSSION—The histologic features of the mixed tumors of the palate are similar to those of the major salivary glands. However, the incidence of recurrence is much higher in the latter location. This could be attributed to (1) the multiple foci of mixed tumor in the major salivary glands, and (2) the incomplete removal of tumor from fear of injury to the facial nerve if the parotid gland is involved. Berger[3] reported 12 instances of mixed tumors of the palate treated surgically and noted no recurrence in those patients who were followed for from 3 to 10 years. These observations are in agreement with those of other investigators.[4-6] Furthermore, a review of the literature indicates that malignant transformation of a benign mixed tumor in this location is very uncommon. Gavin[7] has reported an instance in which the tumor recurred two years after treatment. The patient died with extensive involvement of the oropharynx and nasopharynx and possibly brain metastases. The author believed it to be a case of a benign mixed tumor which underwent malignant change. Similarly, there are only a few cases on record of primary malignant mixed tumor of the palate.[8-10] Otherwise, by far the majority of them are benign in nature. A conservative surgical removal is the method of choice in their treatment.

SUMMARY—A mixed tumor of the palate was seen in a woman 23 years old. This lesion was noted on a routine oral examination. It had caused a considerable bone destruction without any symptoms being present. The lesion was removed and postoperative examinations indicated almost complete regeneration of bone in the palatal defect.

From the divisions of oral surgery and oral pathology, School of Dentistry, University of Minnesota.

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■ WONDER

The world and man are still regulated by laws but man can no longer be certain that one day he will know these laws in their entirety. Both mysterious and coherent: that is the universe in the eyes of the present-day man of science. It was Einstein who remarked that the most incomprehensible thing about the world is that it is comprehensible.—*Taunegny de Quenetain, Réalités.*

Chondrosarcoma of the mandible: *report of case*

■ *Joseph R. Prowler,* D.D.S., Racine, Wis., and*
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The proper position of chondrosarcoma in the classification of bone tumors is not clear. The Registry of Bone Sarcoma has classified and reclassified these tumors; at this writing there is no uniformity of opinion as to what position they should occupy. Lichtenstein and Jaffe[1] have stated their belief that the chondrosarcomas are distinct from the osteogenic sarcomas because of the occurrence of the former at an older age and because of their relative benignity. Geschickter and Copeland,[2] however, have classified these tumors under the osteogenic sarcomas, but take the view that there are two distinct forms, the primary and secondary.

The primary chondrosarcoma, according to these writers, is a periosteal tumor which does not infiltrate bone until late in the course of the disease. It occurs at an early age (14 to 21 years). The early roentgenogram shows a raised periosteum with a faintly visible translucent shadow. This may well be considered the invisible tumor of bone in danger of being overlooked or misdiagnosed. The chief complaint is pain. The clinical course is extremely rapid and rarely exceeds 20 months.

The secondary chondrosarcoma, according to Geschickter and Copeland, occurs at a later age (over 30 years). The early roentgenograms show osteoporosis, usually without cortical expansion but with cortical plate destruction occurring late. The clinical course is relatively slow with repeated local recurrences prior to distant metastasis. Occasional cures follow surgical intervention on the local lesion and its recurrences. The duration is 2 to 20 years with a long history of pain, at first slight and rheumatoid and growing more intense over the years.

Jaffe and Lichtenstein have recognized two forms, the peripheral and central, but have not recognized the primary and secondary forms. Only recently has Lichtenstein[3] reported what he regarded as a pure periosteal chondrosarcoma, a tumor that has the clinical characteristics assigned to the primary tumors by Geschickter and Copeland.

Ewing[4] and Lichtenstein and Jaffe have expressed their belief that the myxoid elements seen in the chondrosarcomas are cartilage degeneration products, whereas Geschickter has stated that he regards these elements as the mother tissue of the tumor.

It is our opinion that all such tumors should be classified as primary or secondary since this classification has real value in determining the prognosis. In their series of cases, Geschickter and Copeland reported that 15 per cent of the patients with primary tumors of the long bones survived five years; none of the patients with primary tumors in the mandible survived that long. Only two primary mandibular tumors were mentioned in their charts. In the patients with the secondary form of the disease, however, 40 per cent survived five years when the tumors appeared in the long bones. In a series of cases reported by Ward and Hendrick,[5] there were no survivors, but no primary-secondary differentiation was reported.

The microscopic differentiation of the primary and secondary tumors is dependent on the relative proportions of the various elements that constitute the tumor.

Histologically, the differential points between chondrosarcoma and mixed salivary gland tumors are few. Both tumors have some degree of myxoid tissue with spindle and stellate cells. Moreover, both tumors may show chondroid elements with pseudocartilage and hyalinized connective tissue in the mixed tumors and fetal and varying amounts of more mature cartilage in the chondrosarcoma. Tissue closely resem-

bling hyaline cartilage is seen in about 20 per cent of the mixed tumors,[6] but it is not true cartilage.

The basic difference between the chondrosarcoma and the mixed tumors histologically is the complete absence of an epithelial element in the former. Although the epithelium may be inconspicuous in the benign mixed tumors, diligent search will reveal it. In the malignant mixed tumor variants, the epithelium will be more conspicuous.

REPORT OF CASE—A 23 year old Air Force officer was admitted to the oral surgery section, 3700th USAF Hospital on July 1, 1955, as a transfer from another hospital. The transfer diagnosis was mixed salivary gland tumor of the lower left third molar region.

HISTORY—The patient had first noticed a mass in April 1955. On May 25 he had sought treatment at the Chanute Air Force Base Hospital. The lesion had been diagnosed as a low grade pericoronitis, the visible mass being regarded as granulation tissue. The 3 by 3 mm. mass was lingual to the ridge crest, directly overlying the crown of the impacted third molar. Roentgenograms taken at that time had revealed a large radiolucent defect around the crown of the third molar and a region of periapical radiolucence about the roots of the second molar (Fig. 1, left).

Treatment with antibiotics and mouth rinses had failed to promote improvement during the ensuing week. On May 31 the upper left third molar had been extracted to remove any possible source of trauma. By June 13 the mass had grown rapidly; biopsies were performed on June 13 and 16. The two pathological reports were identical: "Sections taken from various parts of the lesion show immature, fetal type cartilage intermingled with large cores and nests of tumor cells. The latter are, for the most part, large, and they have prominent nuclei. Mitotic figures are not seen." The diagnosis was "mixed tumor of salivary gland type."

By June 19 the mass had grown to twice its initial size and was causing some low grade discomfort and interference with mastication. The patient was transferred to the 3700th USAF Hospital for further evaluation.

PHYSICAL EXAMINATION—The patient was a well-developed, alert young man in no acute distress.

The blood presure was 118/70; respiration 16 and temperature 98.8° F. Positive findings were limited to the oral cavity.

There was a moderate degree of trismus; the patient was able to open his mouth only about 1.5 cm. anteriorly. A grayish fungating mass was present in the left side of the mouth, attached to the lingual surface of the lower left third molar region and extending poste-

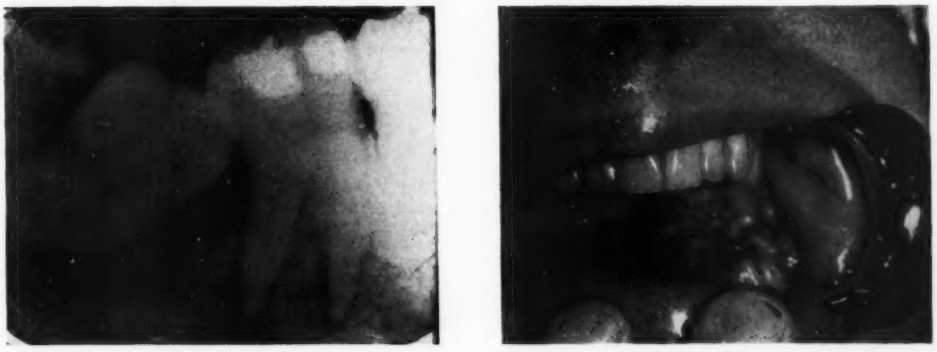

Fig. 1—Left: Periapical view showing radiolucent defects that might have been due to either inflammatory or neoplastic disease. Right: Lesion at time of admission. Note trismus

riorly to the tonsillar fossa. Anteriorly, it extended as a free growth to the first molar region (Fig. 1, right). The teeth and gingivae were in good general condition. The facial nerve and its branches were functionally intact, but there was a complaint of decreasing sensation in the left side of the lower lip. Neurological examination, however, failed to reveal any perceptible difference in sensation between the two sides of the lower lip.

There were multiple, palpable, nontender lymph nodes in the submandibular group and middle cervical group. Either inflammatory or tumor involvement could have been indicated by this finding.

LABORATORY FINDINGS—Blood and urine examinations were normal.

ROENTGENOGRAPHIC STUDIES — Dental films sent with the patient revealed findings as noted previously. Lateral and posteroanterior films of the jaws including laminagrams revealed no evidence of bone destruction. There was relative radiolucency about the malposed third molar.

COURSE IN HOSPITAL—Since the original biopsy report had indicated mixed tumor and since we previously had observed mixed tumors of both parotid and submandibular glands that appeared intraorally, sialograms were taken to rule out this possibility. The parotid sialogram was taken July 2 and was interpreted as showing severe distortion of the entire duct system with extravasation of contrast medium into the gland parenchyma. This finding was consistent with a diagnosis of malignant tumor of the parotid gland.

On July 5 a left submandibular sialogram was taken. It was essentially normal. However, the contrast medium from the parotid study was seen in the upper neck, suggesting that oil had leaked from the parotid capsule.

The biopsy slides transferred with the patient were reviewed and the tissues were reported to show mixed salivary gland tumor, probably malignant. The slides were sent to the Armed Forces Institute of Pathology for confirmation of this diagnosis.

On July 7 the patient was presented to the tumor board. After review of the data and while awaiting a report from the Armed Forces Institute of Pathology, the board recommended a new biopsy to eliminate the equivocation relative to malignancy.

On July 8 an incisional biopsy was performed with the patient under general anesthesia, and segments from all accessible portions of the tumor were removed. The lateral pharyngeal mass was palpated at the posterior border of the mandible, giving the impression that the tumor had extended nearly that far. During the operation, there was no visible evidence of bone involvement.

The pathology report on this biopsy specimen was again "mixed tumor, probably malignant."

On July 14 the tumor board heard the new evidence which included the Armed Forces Institute of Pathology report which was malignant mixed tumor. However, one local pathologist favored a diagnosis of chondrosarcoma. Feeling that the weight of evidence supported a diagnosis of malignant mixed tumor, the board recommended a radical operation including neck dissection.

OPERATION—On July 18 a left radical neck dissection was combined with resection of the mandible from the lower left second bicuspid to the level of the sigmoid notch and the lateral oropharyngeal wall as far posteriorly as the posterior tonsillar pillar, all in continuity. Prior to resection of the mandible, the facial nerve trunk was exposed via a standard parotidectomy incision and the nerve traced forward into the gland. It was found that the parotid gland was clinically normal, and it was elected not to remove it. At the termination of the operation, a separate biopsy specimen of the cut stump of the mandibular nerve was taken.

The patient withstood the procedure well; the recovery was uneventful and the cosmetic result was good (Fig. 2, left).

PATHOLOGICAL REPORT—The final diagnosis was chondrosarcoma of the mandible. The tumor had infiltrated the marrow spaces of the mandible with minimal destruction of

trabeculae which probably accounted for the lack of unequivocal roentgenographic evidence of bone tumor. The tumor was apparently resected with a safe margin anteriorly, but posteriorly, the resection line passed through tumor. The biopsy of the mandibular nerve showed it to be infiltrated by tumor. Figure 2, right, shows the resected segment of mandible.

COURSE—At the tumor conference of August 4, these data were reviewed, and it was the recommendation of the tumor board that the remainder of the left ramus of the mandible be disarticulated.

On August 22 the residual segment of the mandibular ramus was disarticulated through the preauricular portion of the original incision. Biopsy specimens were taken from the surrounding muscle stumps. The patient again made an uneventful recovery.

The pathology report now showed the residual portion of the mandible to be infiltrated by tumor, and the biopsy specimens from the muscle stumps also showed multiple tumor foci.

The patient went on convalescent leave September 8 and returned October 8. During his leave, he experienced episodes of dizziness and fainted on one occasion. Examination when he returned showed massive recurrence of tumor in two distinct locations: one anterior to the anterior resection line, the other posterior to the posterior resection line. These two sites of recurrence quickly coalesced. A trial of radiation therapy was given to no avail. During the ensuing three months he followed a rapid downhill course and died on January 18, 1956.

AUTOPSY REPORT—The patient at autopsy showed massive tumor involvement of the entire left side of the face and neck extending inferiorly to the clavicle. There was a large, ulcerated and purulent lesion at the left of the mental region. The tumor extended inferiorly through the chest wall into the mediastinum and infiltrated the pericardial sac. There were no remote metastases, direct extension being the mode of dissemination.

DISCUSSION—The repeated biopsies of this lesion were reviewed by ten well-qualified pathologists and were discussed by the staff of the Armed Forces Institute of Pathology and by a meeting of local experts. With the exception of one, all had called the lesion a mixed tumor preoperatively.

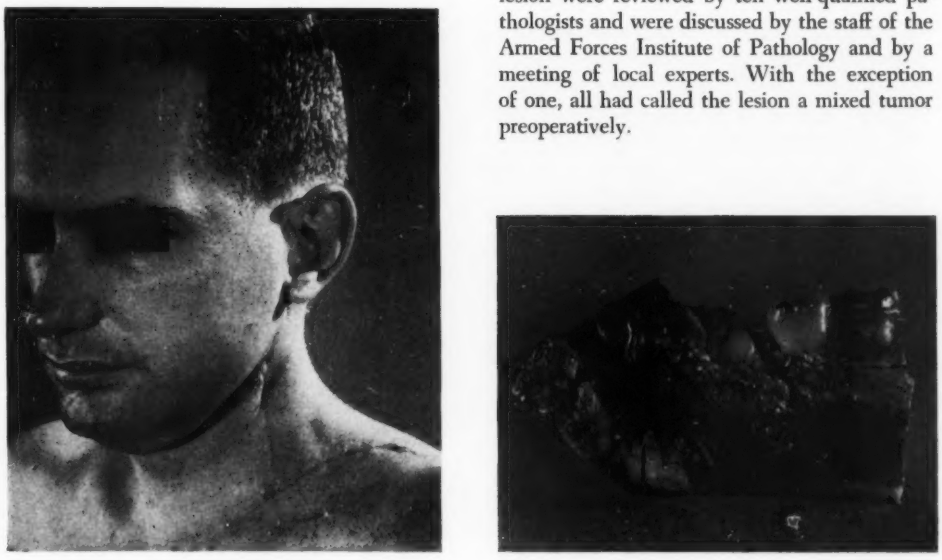

Fig. 2—Left: View of patient two weeks after major surgical procedure. Right: Resected portion of mandible. Note minimal cortical defects

Postoperatively, however, the Armed Forces Institute of Pathology changed its diagnosis to chondrosarcoma. The case was reviewed by an Air Force civilian consultant in pathology with concurrence in the diagnosis of chondrosarcoma. Another eminent pathologist regards it unequivocally as a chondrosarcoma.[7]

The histologic characteristics of primary chondrosarcoma are well-illustrated in this case. Figure 3, left, shows a myxomatous connective tissue with stellate and spindle cells and numerous bizarre mitotic figures. Closely associated is fetal cartilage. In Figure 3, right, is seen the merging of areas of fetal cartilage into more adult forms with a hyaline matrix from which the cells tend to disappear. Seen in the myxomatous connective tissue here are chondroblasts. The myxomatous tissue is densely infiltrated with capillaries. This is the typical picture of chondromyxosarcoma or primary chondrosarcoma. In Figure 4 is seen a bone trabeculum surrounded by masses of degenerating hyaline cartilage.

In retrospect, it can be seen that confusion arose because the tumor first appeared as an intraoral, extraosseous mass. The fact that pain was never a conspicuous feature was also confusing. Clear-cut evidence of bone involvement could not be established by roentgenographic study because of the presence of a common dental lesion which might have produced the same picture. This was compounded by medullary infiltration without actual destruction of normal trabecular architecture.

Clinically, this tumor followed the course of a chondrosarcoma. The spread by direct extension without remote metastases, the almost fantastic rate of tumor growth, and the complete absence of any effect of radiation on its growth pattern are all suggestive of mesoblastic tumor.

The final surgical specimen showed extensive and uniform infiltration of the marrow spaces with little trabecular destruction rather than the spotty regions of osteolysis which are typically seen in infiltrating epithelial lesions.

In terms of the clinical course, age of onset, and absence of a pre-existing lesion, a

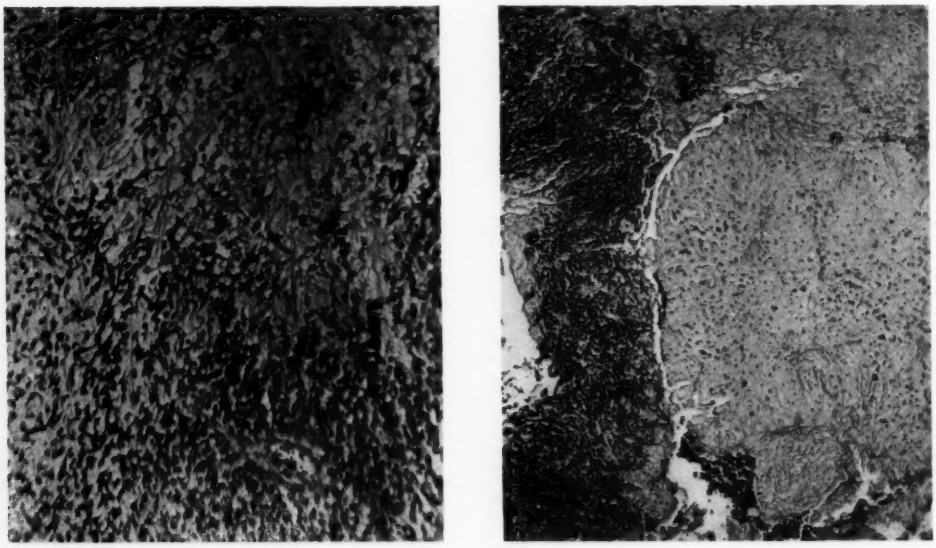

Fig. 3—Left: Section of lesion showing myxomatous element. Right: Section showing blending of fetal cartilage into regions of more sparsely nucleated adult cartilage

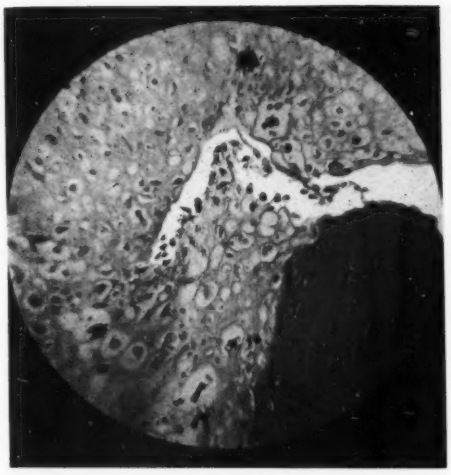

Fig. 4—Bone trabeculum showing surrounding, degenerating hyaline cartilage

diagnosis of primary chondrosarcoma is apparent. The total clinical course of the disease was only slightly over nine months, which is about the same as the most rapid course in Geschickter's series. It would appear that the history of this tumor was as follows: a periosteal tumor arose on the medial aspect of the mandible. It was not roentgenographically demonstrable early because of technical difficulties in examining the mandibular periosteum in this region. It finally infiltrated the mandible through a pre-existing cortical defect over the crown of the impacted molar, and this further obscured an accurate roentgenographic diagnosis.

Although numerous cases of chondrosarcoma of the mandible have been reported in the literature, most have been of the secondary type. Analysis of the cases of Cones,[8] Paul,[9] and an anonymously reported case[10] shows these to be secondary types of tumors. Geschickter[7] stated in a personal communication that he has records of ten cases involving the mandible. Two are mentioned in his text. Pasternack and others[11] reported what would appear to be a primary chondrosarcoma, but the illustrations of histologic sections preclude ruling out malignant mixed tumor, a possibility which is supported by the occurrence of remote metastasis and the site of the original lesion.

SUMMARY AND CONCLUSIONS—A case of primary chondrosarcoma of the mandible has been reported. The difficulty in differential diagnosis of this tumor from mixed salivary gland tumors has been explored. An error in diagnosis by sialography re-emphasizes the need for further study of sialograms of normal salivary tracts. Such a study is now in progress. A problem of differential diagnosis between pericoronal infection and tumor is presented as a source of confusion in diagnosis.

COMMENT—This case is reported since we feel that it is the first documented case of a primary chondrosarcoma of the mandible.—*220 Ninth Street.*

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Loss of the lamina dura in hyperparathyroidism due to carcinoma: *report of a case*

■ *Heyl G. Tebo,* D.D.S., and Jerome M. Serling,† D.D.S., Houston, Texas*

The dentist in a large general hospital is frequently called on to make roentgenographic studies of the teeth and surrounding tissues to determine changes in the lamina dura. Several papers have been published pointing out the connection between loss of the lamina dura and hyperparathyroidism.[1] In the great majority of these examinations the results are negative but occasionally the dentist is able to make an important contribution to the diagnosis of hyperparathyroidism.

Hyperparathyroidism results from an increase in production of parathyroid hormone, which causes an increase of phosphorus in the urine. The serum phosphorus level falls and the serum calcium level rises, resulting in increased amounts of calcium in the urine. Kidney and bladder calculi form because of this high concentration, and the function of the kidneys may be impaired. This phosphorus and calcium is drawn from the bony storehouse.

REPORT OF CASE—A 42 year old white man came to the Veterans Administration Hospital, Houston, Texas, on July 26, 1956, complaining of pain in the right upper quadrant of the abdomen with nausea and vomiting of three days' duration. During the preceding years he had had intermittent abdominal pain and indigestion associated with a 40 pound weight loss. He had been examined several times at other hospitals because of these complaints, but no peptic ulcer or other gastrointestinal disease had been found. A year before admission to this hospital he had noted a gradual onset of hoarseness due to vocal cord paralysis which was attributed to his being in contact with paint.

Physical examination revealed tenderness in the right upper quadrant of the abdomen in the midclavicular line just beneath the ribs. The liver was palpated two finger breadths below the right costal margin. The routine laboratory findings were within normal limits. Roentgenograms of the kidneys showed multiple small regions of calcification. Examination of the upper gastrointestinal tract after a barium meal was within normal limits. Slight mobility of the teeth was noted on oral examination. A full mouth dental roentgenographic examination revealed almost complete absence of the lamina dura and a "ground glass" appearance of the alveolar bone (Fig. 1). No abnormal findings were noted in roentgenograms of the long bones.

Because of gastrointestinal complaints and the liver enlargement, liver function tests were obtained and were normal except for an elevated alkaline phosphatase. A serum calcium determination then was obtained. This was reported as being 17 milligrams per hundred milliliters (normal range 9 to 11 mg.). Calcium excretion studies were made after a four day equilibration period on a 150 mg. calcium diet. Calcium excretion for three consecutive days on this diet was 545 mg., 398 mg. and 512 mg. per day.

A careful examination of the neck was performed, and a nontender mass about 3 cm. in diameter was noted in the region of the left lower pole of the thyroid gland. On September 27 an exploratory operation in this region was performed. The mass was hard and adhered to the lower pole of the thyroid gland, as well as to the esophagus. The left lobe of the thyroid gland and the tumor were removed. The left recurrent laryngeal nerve was found to pass through the tumor, which accounted for the vocal cord paralysis. A diagnosis of malignant neoplasm of the parathyroid gland was given

Fig. 1—Views showing loss of lamina dura and ground glass appearance of alveolar bone in patient with hyperparathyroidism

by the pathologist. No neoplastic cells were seen in the resected portion of the thyroid gland.

On the first postoperative day the serum calcium level dropped from 17 to 12 milligrams per hundred milliliters and continued to drop to 6.9 mg. by the twelfth postoperative day (Fig. 2). About the sixth postoperative day the patient noted a tingling of the lips, toes and hands, but there was no frank tetany. These symptoms responded to intravenous calcium gluconate, and oral calcium maintenance therapy was started with 4 Gm. of calcium gluconate being given four times a day. The serum calcium level began to rise, and the medication was continued until November 15, when it was reduced gradually.

In December the serum calcium had returned to a normal level, and the patient had improved steadily and gained back most of his weight. The patient returned to work, and at the time of his last examination in March 1957, the serum calcium and phosphorus were within normal limits. Repeated dental roentgenographic examinations failed to show any replacement of the lamina dura.

This patient had many of the classical features of hyperparathyroidism, such as gastrointestinal complaints, metastatic calcifications, characteristic changes in blood chemistry, and the absence of the lamina dura. Functioning carcinomas (tumors of glands in which malignant tissue produces typical glandular hormones) of the parathyroid glands are quite

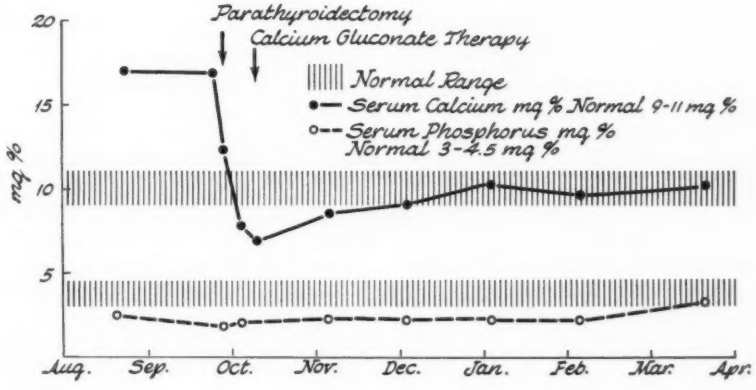

Fig. 2—Serum calcium and phosphorus levels of patient with hyperparathyroidism

rare. The surgical and pathological aspects of this case have been reported previously.[2]

SUMMARY—A case of a functioning carcinoma of a parathyroid gland with resulting hyperparathyroidism is reported. The loss of the lamina dura is an important diagnostic finding which can be contributed by the dentist. When the lamina dura is absent in an otherwise normal patient, the dentist should keep in mind the possibility of hyperparathyroidism and make proper referral of the patient so that further studies can be undertaken.

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†Dental intern, Veterans Administration Hospital.

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Correction of a prognathic mandible: *report of case*

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A 24 year old man came for treatment because of a severe malocclusion resulting from a prognathic mandible. He had a full complement of teeth which were in an excellent state of repair. It was not felt advisable to sacrifice any teeth, since it was noted from the study models that an almost perfect occlusal relationship could be achieved by minimal preoperative equilibration; furthermore, the angles of the mandible were very obtuse, and it was felt that better facial contour could be established by sliding the mandible posteriorly. It was decided to perform an extraoral osteotomy of the ascending rami as advocated by Kazanjian and others.

HISTORY—The patient was a 24 year old second lieutenant in the United States Air Force. His chief complaints were facial asymmetry and difficulty in masticating food. He first had become aware of a prognathic mandible when he was 8 or 9 years old. The condition progressed until he was about 18, after which time no change had been noted. At age 21 he sought treatment for the deformity but was unable to make adequate financial arrangements. He had sought no other treatment until just prior to his admittance at this hospital.

PHYSICAL EXAMINATION—On November 2, 1955, the patient was admitted to the United States Naval Hospital, Great Lakes, Ill. He was a well developed, well nourished white man of average intelligence. He was six feet, two inches tall, weighed 200 pounds, and had not been aware of any change in hat or shoe size in the last three or four years. The mandible was prognathic and displaced to the right, causing moderate facial asymmetry (Fig. 1). A malocclusion existed, with the maxillary first and mandibular second molars being the only teeth in occlusion bilaterally. The mandibular anterior teeth were 5 mm. anterior to the maxillary incisors.

The remainder of the general physical examination was negative. Routine laboratory studies plus blood chemistry studies were all within normal limits.

Roentgenographic examination demonstrated the mandibular prognathism. The sinuses were moderately large and the sella turcica was entirely normal. The skull and mandible were otherwise normal.

COURSE AND TREATMENT—After admission, impressions of the maxillary and mandibular teeth were taken, as was a moulage of the face. The consultant from the department of internal medicine reported that there was no evidence of organic disease or endocrine disturbance. The necessary preoperative work therefore was started. On November 8, occlusal equilibration was begun in order to accommodate the teeth in their correct postoperative occlusal relationship. This was accomplished by occlusal grinding, taking a series of impressions and checking the occlusion on the stone casts. The final impressions were taken on November 10, and cast gold labial and buccal splints were constructed. On November 15, these were attached to the maxillary and mandibular teeth by use of .020 gauge stainless steel wire. The patient was scheduled for surgery on November 22nd.

The preoperative orders were as follows: Nothing by mouth after midnight; pentobarbital 1½ grains at hour of sleep and at 6:30 A.M.; meperidine hydrochloride, 100 mg., and scopolamine 1/200 grain, intramuscularly, at 7:30 A.M. The operation was scheduled for 8 A.M. and 500 cc. of preserved matched whole blood was made available.

OPERATION—The patient was anesthetized with 2 per cent thiopental sodium plus nitrous oxide and oxygen, through a nasal endotracheal tube. Along with the intravenous fluids, a 0.1 per cent solution of succinylcholine chloride was administered for the required muscular relaxation.

After proper skin preparation and application of drapes, the surgical site was infiltrated with 2 per cent lidocaine and an incision was started at the anterior border of the masseter

Fig. 1—Preoperative views taken November 2, 1955

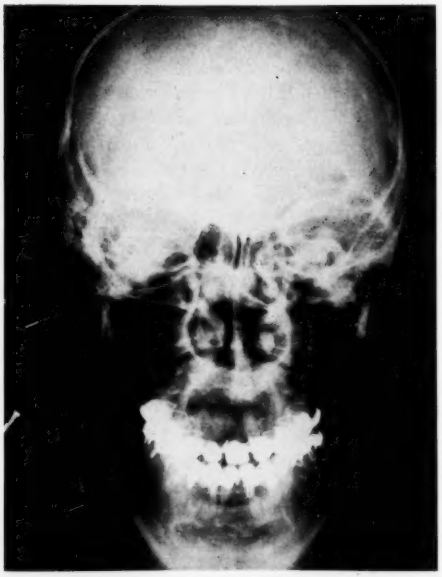

Fig. 2—Roentgenogram taken January 5, 1956, approximately six weeks postoperatively. Both the osteotomy sites are well aligned. Note transosseous wiring on left side

muscle 1 cm. inferior to the lower border of the mandible, extending around the angle of the mandible for approximately 5 cm. The platysma muscle was identified and cut horizontally. By blunt and sharp dissection, the inferior border of the mandible was exposed.

The attachment of the masseter muscle was separated from the lower border of the mandible, and the muscle was reflected laterally and superiorly exposing all of the lateral surface of the ascending ramus. A thin, broad, blunt-ended, periosteal elevator was introduced around the posterior border of the ramus and carried around the medial surface, closely hugging the bone superior to the lingula, in order to protect the mandibular vessels and nerve. A line was drawn horizontally across the ramus halfway between the lingula and the sigmoid notch, and the ramus was sectioned with burs and chisels. Hemorrhage occurred despite the precautions. It was controlled by the insertion of Gelfoam saturated with thromboplastin and bone wax. A moist sponge was placed over the wound and the procedure was repeated on the opposite side. No hemorrhage occurred here.

At the completion of this stage, a member of the operating team used intermaxillary wiring and elastics to position and secure the teeth in their new occlusal relationship. The surgically fractured sites were then visualized and it was noted that the right side was well positioned and in good contact whereas the left was slightly out of contact. Therefore, a bur hole was drilled on either side of the osteotomy on the left side, and .020 gauge stainless steel wire was used to ligate the fragments in good relationship. The wounds were closed using no. 00 plain catgut for the deep structures and no. 0000 chromic catgut on the superficial layers. Dermalon, no. 00000, was used to close the skin. Hyaluronidase, 3 cc., was injected into the masseter muscle bilaterally, nitrofurazone gauze was placed over the wounds, and a pressure dressing applied.

POSTOPERATIVE COURSE—The patient responded well to the surgical procedure. On November 24, the dressings were removed. Edema at the surgical sites was minimal. Nitrofurazone gauze and light dressings were placed over the wounds.

On November 26, a regime consisting of application of the infra-red lamp, 15 minutes twice a day to both sides of the face, was instituted, and was continued for ten days.

The postoperative course continued satisfactorily, and on December 2 postoperative roentgenograms demonstrated that the surgical fracture sites were properly aligned. On January 5, 1956, another series of roentgenograms were taken which revealed that the osteotomy sites were well approximated and healing properly (Fig. 2).

On January 23, some of the intermaxillary traction was removed. The occlusion had been maintained adequately and on February 4, all of the intermaxillary traction was removed. On this same date, a head cap and rubber chin sling were constructed for the patient to wear at bedtime. On February 6, the intermaxillary cast gold splints were removed; on February 8,

the occlusion was equilibrated and a thorough scaling and oral prophylaxis carried out (Fig. 3, left). On February 9, impressions of the teeth and the face were taken and casts poured. Photographs taken on February 16 show the improved facial contour (Fig. 3, right).

The patient was observed until February 23, at which time he was discharged from the hospital. Roentgenograms taken on the day prior to discharge—three months after surgery—revealed the bilateral osteotomy sites, with the fragments in anatomic position and evidence of complete healing. No unfavorable osseous or joint changes were demonstrable. Figure 4 shows the preoperative and postoperative occlusal relation of the teeth.

SUMMARY OF CASE REPORT—This young man had been aware of a prognathic mandible for 15 or 16 years. He was much concerned over the fact that he could not masticate his food adequately, and also over his relatively moderate facial asymmetry. A thorough search for endocrine dysfunction revealed nothing. After preoperative occlusal equilibration, and construction and application of full coverage labial and buccal cast gold splints, an extraoral modified Risdon approach was used to perform a bilateral osteotomy of the ascending rami. Transosseous wiring was applied on the osteotomy site on the left side of the jaw in order to maintain satisfactory adaptation of the fragments. The mandible was kept under traction for 11 weeks.

DISCUSSION—The procedure employed in this instance for correction of malocclusion due to prognathism is an excellent one. One point that has been stressed numerous times, and that bears repetition, is that when an osteotomy of the ascending rami is performed, intermaxillary traction should be maintained for three months. Almost all of the failures that occur, when the ascending rami of the mandible are

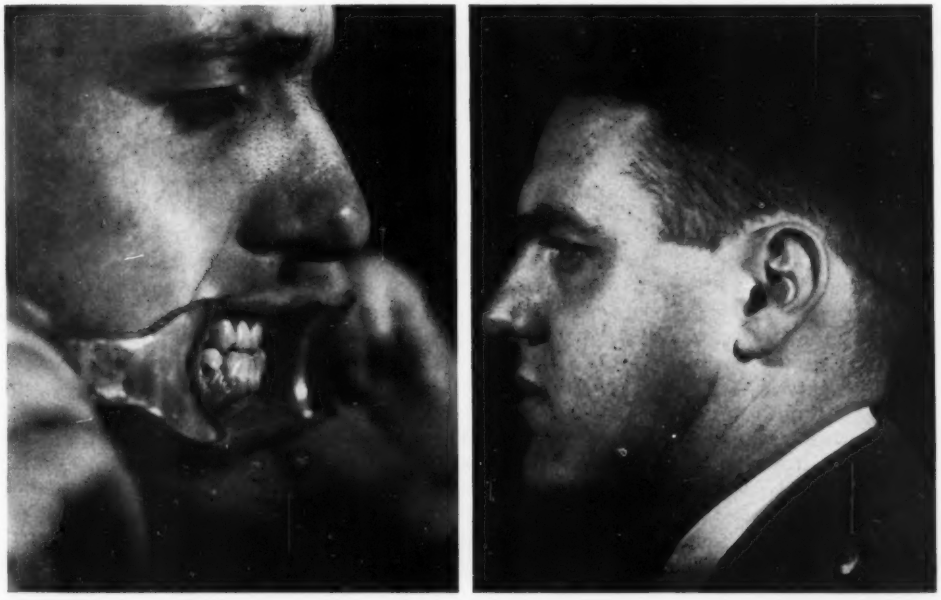

Fig. 3—Postoperative views taken 11 weeks after surgery, immediately after removal of intraoral fixation appliance

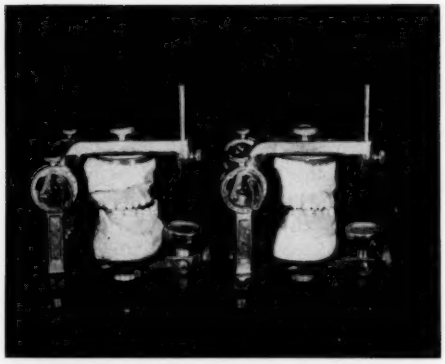

Fig. 4—Stone casts mounted on Hanau articulators, showing occlusal relations of teeth both before and after treatment

used for the surgical site, are due to the fact that traction has not been maintained for a sufficient length of time.

Numerous approaches have been advocated and employed for access to this region. Important points in favor of the procedure described herein are that the position of the coronoid process is not altered, and that there is good visibility of the surgical site even after the teeth have been occluded and maintained in their new occlusal relationship. This latter point is important since the success of surgery in this region depends on good approximation of the osteotomized sites.

An excessive production of the growth hormone may give rise to prognathism. It is important in all instances in which surgical intervention is contemplated for correction of prognathism, that the possibility of a hyperactive pituitary gland be considered. If acromegaly is present, then the patient should receive the indicated systemic treatment.

In all elective surgery, all means should be employed to ensure that the patient is in a near perfect state of health prior to intervention. Nourishment and rest, before and after surgery, are of great importance, and are the responsibility of the surgeon. Vitamin therapy, as an adjunct to the liquid diet that the patient will be subjected to during his period of convalescence, should be evaluated thoroughly.

If intermaxillary fixation is to be relied on for long periods of time, well adapted and well secured intramaxillary splints should be employed. Time and effort spent in this phase of the procedure along with careful preoperative occlusal equilibration will help greatly to achieve the desired end result.

The opinions or assertions contained in this article are the private ones of the writer and are not to be construed as official or reflecting the views of the Navy Department or the naval service at large.

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■ Balance Among the Sciences

It seems much more probable that human happiness will come from the discoveries in the biological sciences than from the discoveries in the physical sciences. If there were a choice between a cure of cancer and the development of nuclear power, most of mankind would prefer the cure of cancer. As a corollary, it seems almost inescapable that the current preponderance of mankind's scientific effort toward the physical, rather than the biological sciences is wrong. . . It is one of the most important public responsibilities of science at large to redress the balance between physical and biological sciences, to direct more of the world's scientific resources along lines which are more concerned with the issues of human health and human happiness.—*A. M. Weinberg, Prospects in International Science, Bull. Atomic Scientists, Dec. 1958.*

Growth and the ameloblastoma: *report of case*

■ *Denis C. Smith, F.D.S., R.C.S., East Grinstead, Sussex, England*

Ameloblastomas commonly occur in the mandible, particularly in the region of the third molar tooth. Ectodermal in origin, they are perhaps the most important pathological derivatives of the dental lamina. They may be classified according to their roentgenographic and histologic appearance.

Roentgenographically they may be divided into the monocystic or the polycystic type, the former often simulating a simple radicular or dentigerous cyst.[1]

Histologically they may be differentiated into groups which are seldom found in their typical form. These include the primitive, plexiform, stellate, follicular and acanthomatous types.[2]

Willis[3] states that to distinguish between the benign and the malignant is futile histologically and that they should all be regarded as malignant tumors in that they are locally invasive and prone to recur. He considers metastasis into the cervical glands to be infrequent, and where metastasis is present in the lung, it may be explained by inhalation of fragments of the tumor into the bronchial tree.

Anatomically an ameloblastoma which originates in the mandible may invade the ascending ramus and spread into the condylar and coronoid processes. It may also involve the extraperiosteal tissues. In adolescence it may therefore interfere with the main growth center, causing either asymmetrical development, or, in extreme cases, lack of development of the condylar cartilage and thus of the mandible.

REPORT OF CASE—The patient, a boy aged 12 years, was first seen in October 1949 with a large swelling of the body and angle of the left side of the mandible. There was no restriction of mandibular movement or interference with function. A sinus 2.5 cm. in length and 1 cm. in width was present on the buccal side of the alveolar ridge in the molar region, and this led into a large cavity lined with mucosa within which was a hard mass. The enlargement of the inner and outer plates of the mandible extended both buccally and lingually from the premolar region posteriorly into the ascending ramus of the mandible. Roentgenographic examination revealed a large cystlike area which involved the ascending ramus and the posterior part of the mandible (Fig. 1, left). In this cavity there was a molar tooth positioned near the lower border. The neoplasm had obliterated the medullary bone and expanded both inner and outer plates. Clinically and roentgenographically it was considered to be either a dentigerous cyst or a monocystic ameloblastoma.

Silver cap splints were cemented on to the teeth so that the mandible could be immobilized postoperatively. With the patient under endotracheal anesthesia the body of the mandible was exposed through an intraoral incision; the buccal bony wall of the cyst was removed and the contents of the cavity were dissected out intact (Fig. 1, right). The reflected mucosa was then packed into the cavity with ribbon gauze impregnated in Whitehead's varnish. At the end of the operation intermaxillary fixation was established by wiring the maxillary and mandibular cap splints together. This immobilization was maintained for one week, after which the pack was removed and the cavity allowed to granulate.

Microscopic examination of sections of the lining of the cyst cavity showed that it was an ameloblastoma. Characteristic masses of epithelium could be seen to be arranged in well-defined areas of round or angulated over-all shape. The central cells were arranged in an open network of stellate cells and the epithelial masses lay in a fibrous tissue stroma.

By July 1953 it was evident that the lesion

had recurred as a lobulated tumor (Fig. 2, left). The patient was readmitted to the hospital and similar splints were applied. With the patient under endotracheal anesthesia the cyst was again approached through the buccal sulcus and again the cyst contents were dissected out as an intact mass. The second operation varied from the first in that after enucleation of the cyst contents, the cavity was swabbed with Carnoy's solution,[4] a local tissue fixative, and this was followed by a primary repair of the intraoral soft tissues. When the fixation was removed seven days later, some residual limitation of jaw movements remained which persisted until the edema had resolved completely. Full function and movements were recovered slowly.

The new microscopic studies showed some

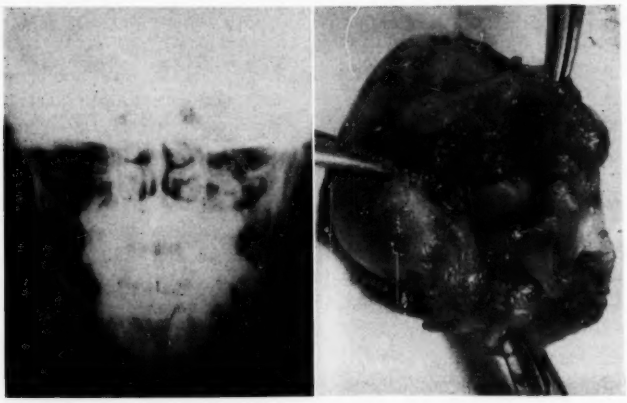

Fig. 1—Left: October 1949. Preoperative posteroanterior view showing monocystic ameloblastoma of mandible. Right: October 1949. Contents of lesion after operation, showing enclosed molar tooth

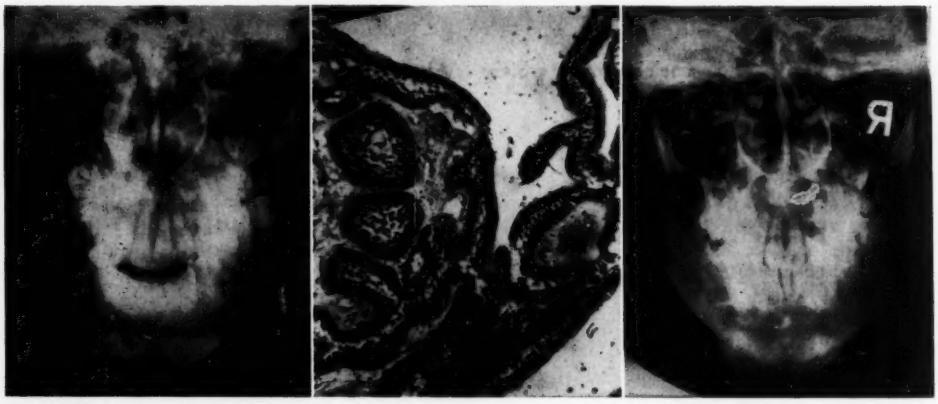

Fig. 2—Left: July 1953. Posteroanterior view showing recurrence of lesion in bilocular form. Center: View showing ameloblastomatous tissue containing epithelial deposits and stromal cyst formation. Right: July 1956. Posteroanterior view showing complete regeneration of bone structure and continuing normal development

changes (Fig. 2, center). There were large masses of epithelium lying in a rather scanty stroma. The epithelial deposits consisted of both central stellate and reticular cells with a peripheral layer of columnar cells. Numerous cysts had formed within the stroma as described by Lucas and Thackray[5] (Fig. 2, right).

The patient has been reviewed at regular intervals, and no further signs of the tumor have become apparent. The structures have returned to normal; the condylar growth center has continued to function and this, combined with periosteal growth, has given rise to a normal symmetrical skeletal pattern.

DISCUSSION AND SUMMARY—Profound differences of opinion exist among clinicians over the proper treatment of ameloblastoma. Therefore in an instance of this type a careful assessment of the advantages and disadvantages of a local or a radical procedure should be made.

Some clinicians maintain that only a radical procedure involving excision of a section of the mandible is justified. In the monocystic type of ameloblastoma this necessitates the removal of a small piece of the tumor for histological examination before the diagnosis can be substantiated. A good case can be stated for the enucleation of the whole mass in the first instance in preference to a small biopsy. A large number of sections may then be examined and a more representative interpretation of the true nature of the lesion may be obtained. If the histological or clinical appearance warrants a resection of part of the mandible, this may be carried out as a secondary procedure. The fact that an ameloblastoma is locally malignant, or more accurately shows a tendency to recur[6] if remnants are left behind at operation, is not disputed.

In the case reported here, two local procedures have been carried out, growth has not been disrupted and a normal appearance with full function has been attained. The condylar cartilage has developed, and new bone has been laid down by the periosteum.

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5. Lucas, R. B., and Thackray, A. C. Cyst formation in adamantinoma. Brit. D. J. 93:62 Aug. 5, 1952.

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■ Microevolution and Macroevolution

The idea of evolution in the broadest sense of universal and all-pervading change and development has become a habit of thought. We take it for granted because in our lifetime we have seen so many innovations—telephone, radio, television, airplane, plastics and antibiotics, atomic and hydrogen bombs and artificial satellites . . . It is needless to emphasize the point that the evolutionary changes described above are small compared to those which led from the *eohippus* to recent horse, or from *Australopithecus* (an animal) to recent man. The former are microevolutionary and the latter macroevolutionary. Nevertheless, microevolution and macroevolution are parts of a single continuum, and studies on the former help to elucidate the latter. After all, the knowledge of the atomic fission and fusion reactions . . . helps to understand the evolution of stellar systems, although the biggest hydrogen bombs generate amounts of energy which are puny compared to those produced in the sun or the stars.—*Theodosius Dobzhansky, Evolution at Work, Science May 9, 1958.*

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The hospital staphylococcus

STAPHYLOCOCCI are widely distributed and are a natural parasite of man. Variations among individual strains in their capacity to initiate disease as well as differences in susceptibility of potential hosts probably accounts for the relatively low incidence of infection due to these organisms.

In the hospital environment, however, there is an increased opportunity for exposure and subsequent acquisition of disease due to staphylococci. This is due to several factors. The incidence of resistant staphylococci isolated in hospitals is high wherever antibiotics are widely used. They are found in cross-infections in patients and are also harbored in a large proportion of healthy carriers among the staff. Many patients also become carriers of resistant strains of staphylococci after one or two weeks of hospitalization. Whether such resistant strains possess increased virulence is debatable, but the occurrence of epidemics, particularly in hospital nurseries, suggests this may at times be true. It is generally recognized, however, that staphylococci from an active lesion are potentially more dangerous than those harbored by a healthy carrier. The latter, however, cannot be dismissed as innocuous.

Hospitalized patients are frequently in poor condition to withstand infection when exposed to pathogenic staphylococci because of the disease or the debilitated condition for which they are admitted. The frequent use of certain therapeutic procedures such as venipuncture and surgical incision which violate the cutaneous barrier to infection, and certain therapeutic agents such as roentgen-ray radiation, steroids and broad-spectrum antibiotics may produce incipient infections and present added opportunities for the hospitalized patient to acquire staphylococcal infections.

Attempts to control hospital cross-infections involve the application of measures which are designed to avoid the dispersal of infective material into the immediate environment and the dissemination of staphylococci from patient to personnel to patient. Thus, strict attention to principles of asepsis and antisepsis must be enforced not only in the operating room but also on the hospital wards. In particular this involves isolation of infected patients or at least of their open lesions by occlusive dressings, adequate masking, good dressing technic and careful performance of cutaneous punctures and incisions. Contaminated dressings and other infected materials should be destroyed immediately or otherwise rendered harmless.

Attempts to treat a persistently healthy carrier by appropriate antibiotics has not been notably successful and it may become necessary at times to transfer a staff member who is a proved carrier to a position which does not require direct contact with patients.

The failure of antibiotics to control the hospital staphylococcal problem thus necessitates the rigid application of the previously mentioned principles of control and the adoption of rules for the discriminate use of antibiotic agents.—*Edward L. Quinn, M.D.*

■ Hospitalization of Dental Patients

Q.—Is there any way to solve the crowded hospital situation as it affects the dental patient who requests or requires hospitalization for a general anesthetic?

A.—The lack of hospital beds for dental patients is a perplexing and difficult one to solve in some localities, but is gradually being rectified by closer cooperation between dental staffs and hospital administrators. In addition, more beds are being added to present installations to correct the general shortage of beds.

In hospitals where there are adequate recovery rooms, much can be done to alleviate the problems for the dental patient. Most of these patients do not require postoperative hospitalization for any protracted period of time except where an extensive oral surgery procedure has been performed. The primary purpose of keeping most patients in the hospital is to evaluate them in reference to postanesthetic problems. These patients often can be kept in the recovery room until fully reacted and then permitted to return home as long as there is someone to accompany them.

As a general outline for handling ambulatory dental patients who undergo general anesthesia in the hospital, the following procedure may be used. This can, of course, be modified to fit the individual situation.

1. Arrangements are made in the operating room for a specific date and time, preferably in the morning, to insure control of fluid and food intake and to permit adequate postoperative recovery.

2. The patient is sent to the hospital for a complete blood count and urinalysis the day before the operation. This will save time and satisfy the requirements of most hospitals and anesthesia departments.

3. The preanesthetic physical examination can be made by the physician before the patient's admission or by the anesthesiologist upon the patient's arrival. This will vary from one institution to another.

4. After the operative procedure, the patient is taken to the recovery room, just as is any patient who has had a general anesthetic. When effects of the anesthesia are no longer evident, he can be released, with the approval of the anesthesiologist.

This procedure satisfies all the requirements for safety and pleases the patients. It also fulfills insurance requirements, since a half day admission is generally counted as a full day occupancy.

This section devoted to queries and comments from readers on topics of current interest to oral surgeons and general dental practitioners is edited by S. Elmer Bear, Department of Oral Surgery, Medical College of Virginia, Richmond, Va., to whom readers are invited to send their communications. The answers, prepared by competent consultants, do not necessarily represent the opinions of any official scientific organization. Your participation in this section is invited.

The Editor.

■ Each year in this country more than 2,000,000 patients are given transfusions of more than 5,000,000 pints of blood. Allergic reactions sometimes occur and are always a threat. Diphenhydramine hydrochloride administered parenterally protects against such allergic reactions, or minimizes them. With the new diphenhydramine hydrochloride ampule, 50 mg. per cubic centimeter, it is easier to add this safety factor to transfusions. The contents of one ampule are added to each unit of blood. This is a council-approved use listed in *New and Nonofficial Drugs*.

Clinical studies show that parenterally administered diphenhydramine hydrochloride is also useful in protection against postoperative nausea and vomiting. The patient gets a better, faster start on his convalescence.

Parenterally administered diphenhydramine hydrochloride can be given with meperidine hydrochloride, atropine or scopolamine. It can be administered before surgery. Reports show that diphenhydramine hydrochloride potentiates the action of these agents.

■ In "Clinical Observations" in the January issue of the JOURNAL OF ORAL SURGERY, ANESTHESIA AND HOSPITAL DENTAL SERVICE, the use of kanamycin sulfate (Kantrex) was suggested as the antibiotic of choice when a resistant strain of staphylococcus was encountered. It was pointed out that caution should be exercised in its use because extensive clinical evaluation had not been completed and the drug should be used only when other antibiotics failed.

More recent clinical experience has suggested that the side effects are more serious than at first anticipated. Reports are being made concerning eighth nerve damage which has been irreversible in some instances. Until further information is made available, this drug should be used only under the most carefully controlled circumstances.

■ Methocarbamol (Robaxin) became available commercially in late 1957 and has proved to be an effective nontoxic medication for the relief of muscle spasm. Muscle spasm may occur as a result of acute trauma, as well as after certain oral surgical procedures. Use of a muscle-relaxant drug not only renders the patient far more comfortable, but also helps to maintain optimal conditions for the successful outcome of the operation. Methocarbamol has also proved to be a valuable adjunctive drug in the correction of the bruxism habit. In those patients in whom muscular spasm interferes with various measurement proceedings, such as centric measurement, satisfactory results may be obtained after the use of methocarbamol to relieve the interfering spasm.

The dosage of methocarbamol should be in the range of 4 to 8 Gm. per day. This may be given as an oral preparation (500 mg. pressed tablet) or muscle relaxation may be initiated with intravenous administration and thereafter maintained by oral administration. The intravenous use of the injectable form of methocarbamol allows for establishment within 10 to 15 minutes of muscle relaxation. The intravenous form of methocarbamol is available as 1 Gm. of medication in 10 cc. of vehicle. This is slowly injected intravenously, at a rate of 3 to 5 minutes for each 10 cc. injected. A dosage of intravenous form may be from 1 to 6 Gm. to initiate the original relaxation, depending on the amount of skeletal muscle spasm originally present.

Readers are invited to send their clinical observations to S. Elmer Bear, Department of Oral Surgery, Medical College of Virginia, Richmond, Va.

■ TUMORS OF THE ORAL REGION. In Dental Clinics of North America. Edited by Hamilton B. G. Robinson, D.D.S. 143 pages with illustrations. Index. $3.00. Philadelphia, W. B. Saunders Co., 1957.

This condensed little book is prepared in the form of a comprehensive, yet concise and understandable, symposium on oral tumors. It obviously is addressed to the general practitioner, both medical and dental, and designed to give a general picture of the oral cancer problem. Thirteen contributors review the oral neoplasms and their tumorlike counterparts region by region, expressing their views on etiology, clinical features, treatment and histopathology. Ten of the contributors are highly qualified oral pathologists; the remaining three include a general surgeon, a prosthodontist and a teacher of dental technology.

The value of the material lies in the fundamental, brief manner in which it is presented. Introductory chapters are on "precancerous" lesions and tumors of the salivary glands, and succeeding chapters list and discuss tumors of the lips, tongue and floor of mouth, buccal and labial mucosa, and palate and gingiva. Two chapters review benign and malignant tumors of the jawbones, and one covers odontogenic tumors. There is an excellent resumé of the modern concept of treatment of oral cancer, followed by two discussions on prostheses for postoperative deformities. There is an abundance of carefully selected illustrations.

The symposium approach to presentation of the subject leads to inconsistency in chapter formats, some repetition, and slight variation and disagreement between the participants. This minor defect, however, in no manner distracts from the value of the book.

This text not only gives the dentist and physician a ready reference source for the fundamentals of oral tumors, but also serves to refresh the minds of those interested in this aspect of disease and stresses the necessity for constant awareness of the significance of oral tumors.—*Herbert J. Bloom.*

■ EMERGENCY WAR SURGERY, NATO HANDBOOK. 411 pages with 18 illustrations. Index. $2.25. Washington, D. C., Government Printing Office, 1958.

This compact handbook sets forth the principles for the care of casualties in any forward area of combat. It is intended to enhance total medical care for every member of the Allied fighting forces whenever and wherever he may become a medical responsibility because of injury. The outlines for management of injuries cover only the principles and technics of emergency care of casualties through the first three echelons of medicomilitary treatment of the injured; that is, the battalion aid station, the clearing station, and the field or evacuation hospital. No attempt is made to define the principles or discuss the problems of definitive care which may terminate in large general hospitals.

The book is divided into four sections as follows: Types of Wounds and Injuries, Response of the Body to Wounding, General Considerations of Wound Management, and Regional Wounds and Injuries. Under each heading there are ten or more chapters which provide clear, concise detailed information, devoid of extraneous material. At the end of each chapter are brief comments on the management of mass casualties which suggest measures, based on compromises, that would save the lives of the greatest possible number of victims during the initial critical hours of a mass casualty situation.

Although the book was prepared for use

by military personnel, a reader can find ample material applicable to the civilian problems arising when injuries are to be dealt with; it should be of particular interest to those vitally concerned with certain aspects of civilian defense. The chapter on shock and resuscitation is noteworthy in this regard. At the conclusion of the text are appendixes which include a glossary of drugs and several useful tables.

Any practitioner whose professional endeavor includes the emergency care of the injured will find this little book a handy source of worthwhile information.—*Herbert J. Bloom.*

■ YEAR BOOK OF DENTISTRY: 1957-1958 SERIES. Edited by Stanley D. Tylman and others. 480 pages with 338 illustrations. Index. $6.50. Chicago, The Year Book Publishers, Inc., 1958.

The dentist in general practice or the family dentist will find this compendium of oral therapy informative, interesting and instructive. The abstracted material from domestic and foreign literature is selected with the aim of serving as a ready reference source. Case reports with illustrations, tables and charts help the practitioner to locate information on daily problems in clinical dentistry. The comments by the editors in the footnotes throughout the volume add to the instructional value of the book.

As a guide to oral therapy, this volume starts with a look at treatment in six phases of general practice, omitting in this edition the chapter on oral diagnosis. Oral health service is covered in the chapters on endodontics, periodontics, oral medicine, orthodontics, surgery and related pathologic conditions, and restorative and prosthetic dentistry. The omission of the chapter on oral diagnosis may be considered a matter of text rearrangement, rather than a minimization of the importance of diagnosis in rational therapy. On the contrary, diagnosis is stressed in endodontics, in periodontics, in oral medicine and other treatment. The index does not include the word diagnosis.

The growing interest on the part of dentists in the basic dental sciences and their impact on clinical dentistry has resulted in a greater concern about dental research. Research in prosthetic dentistry has resulted in a greater concern about dental research in other fields. Research in prosthetic dentistry is given 18 pages. A record of advances in research in oral surgery, oral restoration and other treatments might invite more readers.

As a convenience to the practitioner who is concerned with broadening the biologic and health foundation of his practice, the book might open with "Oral Medicine" as a separate and leading chapter. This could be accomplished easily simply by rearranging the first three chapters, with no additional expense or labor. A slight redistribution of pages would give the dentist ready access to information about nonsurgical oral mucosal lesions of oral medicine, discussed in 30 pages, while pedodontics covers 35 pages and periodontics 38 pages. These are distinct phases of oral therapy and should not be lumped together. Besides, it is confusing to the practitioner.

A colorful portrayal of the impact of socioeconomic trends on dental practice is contained in the chapter on dental health. With the limited information generally available, and with the lack of general understanding of emerging forms of group purchase of health care, dentists will find here data they have been looking for on such subjects as radiation hazards, health insurance, consumer plans, group practice, social dentistry in other countries, fluoridation and related fields.—*C. W. Harper.*

■ PATHOLOGY FOR STUDENTS OF DENTISTRY. By George L. Montgomery. Second edition. 301 pages with 134 illustrations and 14 color plates. Index. No bibliography. $8.50. Baltimore, Williams & Wilkins Co., 1958.

The author, in an attempt to limit the content of the text to fit into the busy curriculum of the dental student, has neglected much necessary material.

There is practically no mention of the endocrine system, or the theories of reaction to stress—in relation to the anterior pituitary-

adrenal cortical axis. Another subject which is conspicuous by its absence is that of bone pathology. These are only two of the aspects which are becoming increasingly more important in dentistry today.

The chapter on causation of tumors is very interesting and informative, especially from a historical aspect. The photomicrographs and color photography are outstanding. However, on page 160 there is a color plate marked "leukoplakia of the floor of mouth" which should be marked leukoplakia of posterior palate. This kind of error is understandable in a new publication of this type.

The material contained is well organized and well presented; however, the author's oversimplification of a key subject which is basic to modern dental education leaves much to be desired.—*James B. Edwards.*

■ THERE IS AN ANSWER TO CANCER. By Leonard B. Goldman, M.D. 178 pages. Appendix, bibliography, index. $3.50. New York, Harper & Bros., 1958.

This book's title is, perhaps, a little misleading, for Dr. Goldman does not even once intimate that there is a single answer for cancer. Rather, his point is that regular, thorough examinations and patient education are the foremost answer to the problem of cancer. Pointing out in the preface that in 1957 alone over 150,000 Americans were cured of cancer. Dr. Goldman sets the theme for his interesting book.

In its 15 chapters, he covers the subject well, from an opening chapter which treats with "old wives' tales" through sections on the more common types of cancer, all the way down to the final chapter supplying more answers to cancer.

Obviously, the author has at hand a wealth of practical, important information on a subject which professionals and lay people alike often discuss in hushed tones. The book is clearly written for the layman, but in such a realistic style that physicians and dentists might well profit from it. Knowing an answer to a patient's question is not always sufficient. It is also necessary to know how to express an answer—and Dr. Goldman's text will be a valuable aid.

Make-up, typography and the various technical aspects of this book are more than adequate and contribute to its readability.

Perhaps this volume is not suited for the dentist's reception room, but it is well worth his time to read it—and then recommend it to a patient searching for an answer.—*Theodore C. Levitas.*

■ SAFE HANDLING OF BODIES CONTAINING RADIOACTIVE ISOTOPES. HANDBOOK 65. By the National Bureau of Standards, U. S. Department of Commerce. 20 pages with 3 tables. $0.15. Washington, D. C., U. S. Government Printing Office, 1958.

The latest in the series of handbooks published by the National Bureau of Standards on radiation exposures concerns the handling of cadavers by mortuary and medical personnel. It is conceivable that dentists would be called upon to exercise judgment in these matters at times of emergency, disaster, or civil defense activity. The handbook treats the problems of handling cadavers containing such isotopes as Au^{198}, and I^{131}; proper care for the surgeon after accident or injury during surgery or autopsy; the handling of contaminated clothing and instruments; cremation; report forms; dosage calculation, and so forth.—*W. W. Wainwright.*

■ BONE AND RADIOSTRONTIUM. By Arne Engstrom, and others. 139 pages with 59 illustrations. Author and subject indexes. $8.75. New York, John Wiley & Sons, Inc., 1958.

Since the discovery in February 1956 of strontium^{90} storage in the stratosphere and the continuous release of this bone seeker in small quantities over a long period of years, there have been many studies of the potential hazard to human beings from retention of this radioactive isotope in the calcified structures. For the dental investigator, teacher, oral surgeon

or others concerned with the retention of and possible malignancies from radioactive bone seekers, this small volume serves to bring together and analyze the wide variety of reports in the literature. There are not only considerations of the hazards of internal radiation from these sources and theoretical considerations of the mineral substances of bone tissue, but also data on the actual distribution in the skeleton and calculation of dose rates of radiation from these deposits. The book is well written and replete with illustrations of histologic and radioautographic details of the deposition of Sr^{90} in bones and teeth. The authors speak with the authority of actual experience in these investigations conducted at the department of medical physics, Karolinska Institute and the Research Institute of National Defence of Sweden.—*W. W. Wainwright.*

■ Public Exposure to Ionizing Radiations. Daniel Bergsma, M.D., chairman, editorial committee. 55 pages with 14 illustrations. $1.35. New York, American Public Health Association, Inc., 1958.

In addition to the booklet sponsored by the American Dental Association surveying available information on the biological effects of ionizing radiation, a number of small books have appeared of which this is one of the more useful because of the nontechnical language used and the explanatory diagrams. Not only is the meaning of ionizing radiations made clear, but the health problems involved in their use are related to the important historical events of our time. Chapters are devoted to the physical character of radiation, its biological effects, how it is measured, how it is used in the modern world and the possible total effects of public exposure.

Special chapters are devoted to protective action, laws and regulations. An excellent glossary is given at the end of the book in which the dentist will find clarification of such terms as skin dose, threshold dose, tissue dose, tolerance dose, rad., rem., rep., radioresistance, radiosensitivity, and for the discussion of genetic effects, zygote, heterozygous, homozygous, and so on. Unfortunately the American Public Health Association has repeated the guesses of the National Academy of Sciences as to the amount of radiation required to produce a single dental roentgen-ray exposure. The figures as given on page 14 are approximately a factor of 10 too high. If their statement of the amount of radiation received by a person wearing a common wrist watch dial over a period of 30 years is accurate, it is possible with modern dental equipment adjusted according to the recommendations of the American Academy of Oral Roentgenology and the American Dental Association to take at least 75 sets of roentgenograms during the 30 year period and expose the gonads to less than the amount received from the wrist watch dial, assuming that the hands were left in repose. On page 19 the authors are unable to distinguish the difference between skin dose at entrance and absorbed dose. Unfortunately they refer to the maximum skin dose while taking dental roentgenograms as being as much as 350 r. It might be possible to approach this figure if the dentist's equipment were obsolete and if it were misused. This is the type of error that should not be perpetuated in modern publications.

This little booklet is an excellent one for dentists and dental students to study in order to learn the fundamental biological effects of ionizing radiation and the important considerations in the future use of x-radiation.—*W. W. Wainwright.*

■ Surgical Parotitis. R. K. Gilchrist, M.D., and J. R. McAndrew, M.D. A.M.A. Arch. Surg. 76:863 June 1958.

Surgical parotitis is an acute inflammation of the parotid gland, unilateral or bilateral, occurring most frequently after surgical procedures. In the past, it has carried a high mortality rate and has been regarded in the literature as a grave prognostic sign. Patients developing parotitis were usually seriously ill, in poor general condition, dehydrated, undernourished, and with poor oral hygiene. A dry mouth and decreased salivary secretion seem to be the principal precursor to the onset of the disease. The highest incidence has occurred after abdominal or genitourinary tract surgery. The infection, usually caused by the Staphylococcus aureus organism, is generally considered to be an ascending infection from the mouth by way of Stensen's duct. Frequently, the prolonged trauma of pressure on the gland by the anesthetist has been suggested as contributory.

The onset is usually within two weeks after surgery; but, frequently, in four to six days after surgery the first symptom, a localized pain and swelling of the gland, appears. A febrile response occurs within the first 24 hours, with temperatures of 102 to 103° F., along with an acute elevation in the leukocyte count. Mortality ranges from 30 to 60 per cent. Parotitis has rarely been considered the primary cause of death, but it has been indicative of a poor prognosis in those already critically ill. Early treatment was aimed at stimulating salivary secretion by use of mouthwashes, chewing gum and lemon drops, along with warm or cold compresses. Determination of abscess formation by fluctuation is very difficult because the gland is covered by an extremely dense and unyielding fascia. Incision and drainage, therefore, have often been delayed. The resulting scar of the face and fear of injury to the facial nerve have been other reasons given for the delay of surgery. Early surgical drainage, and splitting the parotid capsule have been advocated.

Radium and roentgen-ray therapy for local acute infections including parotitis was reported in 1924, and soon became the treatment of choice, followed by surgical incision and drainage if necessary. With the adjunct of intravenous fluids and antibiotics, a decline in the incidence of postoperative parotitis was seen in 1945.

Seven cases were treated by roentgen rays within the first 12 hours after onset of symptoms and immediately on making the diagnosis. If pain and swelling progressed despite the roentgen-ray treatment, the patients were subjected to decompression under local anesthesia by incising the capsule for 1 to 2 inches, after which warm compresses were applied for several days. Relief from pain was almost immediate, with reduction of the swelling within a few hours, and recovery in several days.—*Vernon J. Sture.*

■ Ectopic Mixed Salivary Gland Tumors of Lips. K. D. Sharma, M.D., and J. B. Shrivastav, M.D. Am. J. Surg. 96:506 Oct. 1958.

Mixed tumors occur at uncommon sites such as the palate, tongue, pharynx, larynx, neck, face, orbit, scalp, auditory canal and lacrimal glands. In many of the large series that have been presented in the literature, approximately 6 per cent of all mixed tumors of the major and minor salivary glands occur in the lips. A study of 50 cases of mixed tumors of the salivary glands in the department of pathology, Medical College, Nagpur, India, revealed a 12 per cent occurrence in the lips. In this series the average age of patients was 23 years. There appears

to be a slight predominance of males in this series.—*Irwin A. Small.*

■ AN UNUSUAL CARTILAGINOUS TUMOR OF THE SYMPHYSIS OF THE MANDIBLE. J. J. Angelo, M.D., and G. W. T. Bentzel, D.D.S. Plast. & Reconstr. Surg. 21:399 May 1958.

The patient was a 56 year old white woman with a rapidly growing tumor located in the midline of the mandible. She stated that the tumor had been present for years. Her main concern was that she could not wear her dentures. Roentgenographic examination revealed an irregular cystic mass involving the mandible. The inferior border appeared intact. Intraoral examination revealed a nonulcerated mass, about the size of a hen's egg, involving the lingual side of the mandible. A preoperative diagnosis of ameloblastoma was made. A submandibular external approach was used and it was noted that there was a line of cleavage in bone. The tumor therefore was enucleated. The underlying bone was curetted. A pathological diagnosis of chondrosarcoma was made. Numerous other diagnoses were made by other pathologists. Three years after initial surgery no recurrence was noted. The consensus is that this cartilaginous tumor is extremely rare and no definitive diagnosis could be made. It is speculated that the tumor may have arisen from Meckel's cartilage or from the surface of bone and secondarily invaded the bone.—*Gilbert S. Small.*

■ TRYPSIN IN THE TREATMENT OF SWELLINGS OF THE HEAD AND NECK—A PRELIMINARY REPORT. Orion H. Stuteville, D.D.S., M.D.; R. P. Lanfranchi, D.D.S., M.S.D., and Sheldon Wallach, D.D.S. Am. J. Surg. 96:787 Dec. 1958.

Trypsin is a proteolytic enzyme having the property to reduce edema of the soft tissues and to reduce inflammation. Intramuscular trypsin has been recommended in the treatment of thrombophlebitis and allied peripheral vascular disorders. The purpose of this investigation was to evaluate trypsin in the treatment of dental infections or swellings of traumatic origin about the head and neck. Intramuscularly administered trypsin, intramuscularly administered trypsin plus an antibiotic, and an antibiotic alone were used in this evaluation. The rationale for combining an antibiotic with the enzyme was that by removing the inflammatory barrier and thus restoring circulation, the proteolytic action of trypsin would allow a greater concentration of the antibiotic to reach the focus of an infection. Twenty-three cases were reported, seven of which were of traumatic origin, and 16 which resulted from dental infections. The number of cases in this series is too small to be statistically significant. Therefore, a conclusive statement regarding the effectiveness of trypsin in the treatment of swellings about the head and neck cannot be made at this time. Intramuscularly administered trypsin is of benefit whether the swelling and inflammation results from infection or trauma. The swelling also abated more rapidly when trypsin was used than when it was not, thus enhancing surgical repair. Intramuscularly administered trypsin combined with antibiotics was effective in those instances in which infection and inflammation were present. The use of photography in creating a permanent record of the clinical course of swellings and inflammations caused by traumatic injury in infection is emphasized.—*Myron Kaufman.*

■ MANAGEMENT OF RECURRENT MIXED TUMORS OF THE MAJOR SALIVARY GLANDS. W. Franklin Keim, M.D. Cancer 2:696 July-Aug. 1958.

There is some divergence of opinion on the recurrence rate of mixed salivary tumors. Statistics vary from 4 per cent to 31 per cent recurrence. This disparity may result from lack of agreement on classification of these tumors, the fact that in any large series more than one surgeon may be involved with the resultant varying degree of skill, and improvements of technic and changes in philosophies concerning the management of these tumors have been discovered.

Recurrence rate for recurrent mixed tumors varies from 20 per cent to 40 per cent. Therefore, one out of every 3 to 5 patients with the recurrent mixed tumor will have further trouble. The best means of preventing this is by good surgery when the primary tumor is resected.

Ten patients with recurrent tumors are included in this series: nine with recurrences in the parotid and one in the submaxillary gland. For these tumors, transoral intubation utilizing thiopental sodium, nitrous oxide and oxygen as the anesthetic agents is advocated. A Y incision is used and a partial parotidectomy with dissection from the main trunk forward is advocated. Ligation of the external carotid artery may be indicated, but this usually is not needed. Irrigation of the surgical defect is used to wash out any possible tumor debris.

The recurrence in the submaxillary gland resulted in the tumor on the medial portion of the mandible extending toward the base of the skull. Resection of the ramus of the mandible with extirpation of the tumor was utilized. Follow-up in these ten cases showed no recurrence in one to ten and one half years.—*Gilbert S. Small.*

■ INFANTILE HEMANGIOENDOTHELIOMA OF THE PAROTID GLAND. Stanley Lane and Alfred Schwarz. Am. J. Surg. 96:784 Dec. 1958.

Parotid tumors are not common in children. At the Columbia University surgical pathology laboratory, Stout has collected over 1,000 salivary gland tumors, about 35 of which were in children. Eleven of these were carcinomas, 18 were mixed tumors, and 7 were hemangioendotheliomas. In 1943 Stout reported 18 proved cases of hemangioendothelioma seen since 1920; two were in children and none involved the parotid gland. The cases were malignant. However, in infants apparently the lesion is better differentiated and probably is less malignant.

A white male child developed a small lump about 1 cm. in diameter in the region of the right parotid gland when he was about ten days old. The size of the swelling increased rapidly and when the child was five weeks of age the swelling was about 4 to 5 cm. in size and located in the region of the angle of the mandible. By nine weeks the swelling was 6 by 7 cm. in size and the lesion was surgically excised. The pathological diagnosis was congenital hemangioendothelioma of the parotid gland. Subsequent reticulum stains confirmed this diagnosis.—*Irwin A. Small.*

■ REPAIR OF PAROTID FISTULAS. Clifford L. Kiehn, M.D.; John D. DesPrez, M.D., and Frederick Hansen, M.D. Am. J. Surg. 96:763 Dec. 1958.

Since 1885, innumerable methods have been reported to correct the annoying defect of a parotid fistula. All of these use some variation of the technic wherein an attempt to reconstruct the original duct system, particularly the primary and secondary ducts, with end-to-end anastomosis, is used. The failures usually were a result of occlusion of the main duct by the formation of scar tissue, thereby damming the salivary stream and causing pain, swelling and secondary infection of the gland. The parotid fistulas and occlusion of the duct system in this series of ten cases resulted from incision and drainage of abscesses, stones too large to pass (with consequent infection and stricture), the severance of the main and minor ducts by the surgical scalpel in the removal of tumors, and cuts from switch blade knives and windshield lacerations. Not one parotid fistula has been seen in more than 100 radical dissections of the neck glands that have been performed by this group for oral carcinoma.

A one-stage operation for the correction of persistent salivary fistula of the parotid gland is successful if the principles of pedicle design and a traumatic handling of tissue are not violated. This procedure should be performed primarily if the diagnosis can be made. The pedicle need not be tubed nor a catheter inserted into the duct system to maintain patency. The installation of methylene blue in the duct system to aid in the dissection for the preservation of the facial nerve is advocated.—*Myron Kaufman.*

■ FIBROMYXOCHONDROSARCOMA OF THE MANDIBLE. J. Bruce Van Gaasbeek, M.D., D.D.S.; William F. Harrigan, M.D., D.D.S., and Frank S. Butler, M.D. Am. J. Surg. 96:780 Dec. 1958.

Odontogenic myxomas usually appear as benign tumors in the maxilla or mandible. They are generally seen in young persons and grow extensively without symptoms except deformity. They are usually associated with unerupted or congenitally missing teeth, which substantiates the view that they may be of odontogenic origin. Most of the myxomas of the jaws that have been reported have some sort of odontogenic involvement. The case studied was probably of odontogenic involvement. It shows the importance of the clinician's viewpoint, for the pathologists consulted interpreted the case as a benign one and the treatment was accordingly. However, this tumor behaved like a malignancy with constant recurrence finally degenerating into a sarcoma.—*Myron Kaufman.*

■ NECROTIZING STATES OF THE MAXILLA. Robert Borkenhagen, D.D.S., M.D., and Roland Kowal, D.D.S., M.D. Am. J. Surg. 96:848 Dec. 1958.

Although extensive necrosis of the maxilla may be fatal, it is not always so; therefore, treatment based on accurate diagnosis may contribute to cure or control. The diagnostic evaluation must be extended and should include repeated microscopic study, bacterial culture and sensitivity tests. Tissue culture must also be included with anaerobic facilities being used. Surgical aspects of diagnosis and treatment should not be overlooked. Exploratory examination may be indicated and is not replaced by use of antibiotics. Serological study, including histories, spinal fluid examination and serologic blood study, is necessary. Biopsy may be needed and, occasionally, electrophoretic studies and tests for amyloid are desirable. A careful selection of laboratory tests and the routing of collected material to the proper laboratory are essential. Whenever possible, a complete necropsy is desirable in a fatal case. Special study at necropsy consisting of meticulous examination of the arterial systems and sinuses, is needed for furthering the understanding of the disease process.—*Myron Kaufman.*

■ BRANCHIOGENIC CYST CARCINOMA. Stanley Lane, M.D., D.D.S. Am. J. Surg. 96:776 Dec. 1958.

Primary carcinoma of the neck of residual branchiogenic origin was first described in 1882. Since that time many studies have been made either to prove or disprove vonVolkmann's observations on this subject. There is such an entity but it is not a common occurrence and certain strict criteria for the diagnosis should be satisfied. The most important criterion is histologic proof of both branchiogenic cyst and carcinoma in the same specimen. Preoperative diagnosis and investigation should include complete examination of the oral cavity, pharynx and nasopharynx, larynx and cervical esophagus and the sinuses. Treatment should consist of total removal, preferably by radical neck dissection or use of radiotherapy after total removal if neck dissection is not performed.—*Myron Kaufman.*

■ PRIMARY TUMORS OF THE INFRATEMPORAL AND PTERYGOPALATINE FOSSAE. Sherman O. Strand, M.D. A.M.A. Arch. Otolaryng. 68:437 Oct. 1958.

Tumors occurring in the infratemporal and pterygopalatine fossae are rare and in the early phase are likely to cause symptoms similar to sinusitis, odontalgia, and the well-known neuralgias. A search of the literature reveals that primary tumors of these fossae, with the symptomatology and physical signs, have not been previously recorded. Two primary malignant tumors of the infratemporal fossa (a low-grade chondrosarcoma and a neurofibrosarcoma which may have originated first in the pterygopalatine fossa) were studied. At the onset, these tumors do not exceed the limits of the fossae, and physical findings within the oral cavity,

nose or nasopharynx are negative. Tumors arising in the infratemporal fossa present a different symptomatology from those of the pterygopalatine fossa or the sinus of Morgagni. Differential diagnosis is facilitated if the anatomy of these regions is kept in mind. The buccinator nerve is the largest branch of the anterior division of the mandibular nerve and is important in the symptomatology of the infratemporal fossa.

Related diseases which must be considered in the differential diagnosis involving this region are infection, and tumors of the parotid gland, mandible, zygoma and maxilla, which present similar physical signs. Infratemporal fossa tumors most frequently cause symptoms of constant pain of increasing severity over the distribution of the mandibular nerve. The course of the buccinator nerve is likely to be interrupted by the lesion, causing paresthesia or anesthesia of the skin at the corner of the mouth and in the buccal mucous membrane, though later there may be anesthesia of all branches of the mandibular nerve. As the tumor mass enlarges it may appear through the sigmoid notch or buccal vestibule. Trismus and deviation of the mandible occur as the pterygoid muscles are involved. Later the eustachian tube becomes obstructed and there is fullness of the soft palate and nasopharynx. In 1911 Trotter described a syndrome consisting of a triad: deafness, pain, and anesthesia in the area of distribution of the mandibular nerve with subsequent asymmetry of the palatal muscles, which resulted from an endothelioma of the infratemporal fossa. Tumors of the pterygopalatine fossa give rise to pain or anesthesia throughout distribution of the maxillary nerve, and subsequent symptoms of orbital involvement. Jacod described a syndrome developing from a sarcoma of the eustachian tube which produced a combined clinical picture of both Trotter's and the pterygopalatine fossa syndrome. Costen's syndrome is described as a malfunction of the temporomandibular joint. Sluder placed all obscure aches and neuralgic pains of the lower half of the face into a group which he considered to be sphenopalatine neuralgia.

It is believed that chondrosarcoma develops from full-fledged cartilage, and portions of craniofacial bones that pass through a cartilaginous phase are more likely to develop primary cartilaginous tumors than bones which are ossified directly from primitive connective tissue. The portion of the infratemporal fossa most likely to be the site of origin in development of chondrosarcoma would be the cartilage of the temporomandibular joint at its medial anterior surface, the great wing of the sphenoid bone or the lateral pterygoid plate.

The surgical cure of malignant tumors of these fossae may always be considered difficult. Patients selected for radical surgery should be those that can be expected to survive the procedure and there should be a reasonable chance of excising the growth. It is generally considered that chondrosarcoma is insensitive to radiation, and it is also felt that radiation therapy is of little or no value in treatment of neurofibrosarcoma.

Undiagnosed, persistent facial pain of mandibular nerve origin with anesthesia of the distribution of the buccinator nerve is suggestive of a lesion in the region of the infratemporal fossa.—*William J. Amaral.*

■ VITALLIUM IMPLANT FOR TRANSECTED PORTION OF THE MANDIBLE. Stanley L. Lane, M.D., D.D.S.; Benjamin Hoffman, D.D.S., and Jules V. Lane, D.D.S. Am. J. Surg. 96:768 Dec. 1958.

Inert nonorganic implants are of use after mandibular transection. Too often, intraoral prosthetic restoration in cases of mandibular loss presents problems which could be more readily solved if immediate reconstruction had been undertaken. The surgeon and the maxillofacial prosthodontist can act as a team for the treatment and rehabilitation of the patient with cancer of the head and neck. The use of implants to replace the resected mandible is one phase of this cooperation. A technic using a preformed, specially constructed Vitallium prosthesis which is inserted at the time of the surgical resection is particularly indicated in cases in which the condyle is to be removed.—*Myron Kaufman.*

Announcements

■ Third Institute on Hospital Dentistry

The Third Institute on Hospital Dentistry will be held May 18-21 at the Palace Hotel, San Francisco. The announcement was made by O. J. McCormack, chairman of the Council on Hospital Dental Service of the American Dental Association.

Among the subjects which will be explored are the place of dental service in the hospital, the functioning of hospital dental service, and the responsibility of patient care. Discussions will be held on prepayment plans for hospital dental care, and discussion groups will be formed to give participants an opportunity to seek solutions to their problems.

A visit to a Public Health Service hospital in the San Francisco area has been planned to demonstrate integration of dental services.

Applications for attendance should be sent to the Council at the A.D.A. Central Office, 222 E. Superior St., Chicago 11, or to the Institute Office, American Hospital Association, 840 Lake Shore Dr., Chicago 11.

■ Middle Atlantic Society Elects Officers

New officers of the Middle Atlantic Society of Oral Surgeons are:

President, Charles Loveman, Baltimore, Md.; president-elect, Edward Armbrecht, Wheeling, W. Va.; vice-president, Sterling G. Mead, Washington, D. C., and secretary-treasurer, Irvin V. Uhler, Lancaster, Pa.

■ Centenary Meeting of the German Dental Association

The dental profession of Germany will celebrate the 100th anniversary of the creation of the German Society of Dentistry within the congress program prepared for the 14th "Day of Dentistry" (Deutscher Zahnärztetag). Both celebrations will take place at the new Congress Hall in Berlin September 3-6.

Professor Ewald Harndt, chairman, and Dr. Erich Müller, president of the German Dental Association, extend to the dentists of all countries an invitation to attend the centennial meeting. The preliminary program includes scientific sessions, exhibitions of the German and other countries' dental industry and social events such as banquets, fashion shows and sightseeing.

Dentists desiring to present a clinic or to exhibit a film should contact Professor Ewald Harndt, Kurfürstenstrasse 132, Berlin, W. 30, Germany, on or before March 31.

Requests for room reservations can be made to the meeting's secretary, R. Braun, Universitätsstrasse 73, Köln-Lindental, Germany.

■ England Celebrates Centenary of Granting of Royal Charter

The centenary of the granting of the Royal Charter by which the Diploma of Licence in Dental Surgery in England is granted will be celebrated this year.

The Council of the Royal College of Surgeons of England has appointed a committee, headed by G. H. Leatherman, to prepare a program of celebration to take place July 22-24.

Historical exhibition, scientific demonstrations, lectures and a Centenary Festival dinner will be held at the Royal College of Surgeons in London. The University of London will hold a reception for those attending at the Senate House.

The Menzies Campbell Lecture will be given by Professor Robert Bradlaw and there will be a scientific symposium on treatment of the cleft palate.

■ Oral Surgeon Develops New Plate for Jaw Fractures

A University of Southern California oral surgeon has developed an L-shaped metal plate about a half-inch long that will vastly improve present methods of treating fractured jaws in humans.

Already tested on 150 human subjects, the tiny plate will mean less blood loss, less bone and tissue damage, and elimination of former complications, hazards and inefficiency in the healing process.

The new L-plate, developed under a Public Health Service grant by Marsh E. Robinson, head of the department of oral surgery with the USC School of Dentistry, has an L-lap along its edge that fits into a hairline-thin slot drilled perpendicular to the fracture line in the jaw. It requires only two specially designed screws and is made of a malleable metal alloy so that it can be shaped to fit the curve of the jaw.

■ Tennessee Chosen for Meeting of Oral Surgeons

The Southeastern Society of Oral Surgeons will hold its annual meeting May 7-9 at the Riverside Hotel in Gatlinburg, Tenn.

Details may be obtained from the secretary-treasurer, P. B. Whittington, Jr., 228 Medical Arts Bldg., Greensboro, N. C.

■ Histopathology Study Club

The role of oral medicine in the practice of dentistry will be discussed at the 13th annual meeting of the American Academy of Dental Medicine May 14-17. The meeting will be held at the Hotel Claridge in Atlantic City.

Outstanding clinicians will discuss various phases of the subject, including the basis for roentgenographic manifestations of oral disease, ulcerous and granulomatous lesions of the mouth, the interrelation of systemic imbalances and the behavior of oral tissues, the oral microbiota in health and disease, drug therapy of oral diseases, oral lesions pathognomonic of systemic disease, rationale for successful endodontics, and the relationship of endodontics to oral medicine.

■ Michael Reese Hospital Internships

Michael Reese Hospital announces that it is now receiving applications for its 12 month dental rotating internships which start July 1. The Michael Reese Hospital department of dentistry is approved by the American Dental Association Council on Dental Education and Council on Hospital Dental Service.

Information and application forms can be obtained from the dental department, Michael Reese Hospital and Medical Center, 29th St. and Ellis Ave., Chicago 16.

■ Metropolitan Conference of Hospital Dental Chiefs

All dentists on hospital staffs are cordially invited to attend a special meeting of the Metropolitan Conference of Hospital Dental Chiefs to be held during the Centennial Session of the American Dental Association. The meeting will take place Monday, September 14, from 3:30 to 5:30 P.M. in the Regina Coeli Hall of St. Clare's Hospital, 427 W. 52 St., New York.

Outstanding dentists have been scheduled to speak on the progress in hospital dentistry through regional organizations. Further particulars can be obtained from the chairman, Dr. I. E. Gruber, Special Meeting Committee, 12 Harmon St., Brooklyn 21.

■ Walter Hyde Receives Gies Editorial Award

Walter Hyde received the first William J. Gies Editorial Award for his editorial, "Throw-Aways," which appeared in *North-West Dentistry* July 1957.

George C. Paffenbarger, a member of the board of directors of the William J. Gies Foundation for the Advancement of Dentistry, presented a plaque to Dr. Hyde at the annual meeting of the American Association of Dental Editors in Dallas.

This award, which includes a prize of $200, will be an annual event. Graduate dentists are invited to submit editorials published in nonproprietary dental journals in the United States and Canada for the 1958 award. Papers should be limited to 750 words, appear in the 1958 volumes of the journals, and be submitted to the chairman of the editorial award committee, John P. Traugott, 121 E. 60 St., New York 22.

Editorial communications

■ ORIGINAL COMMUNICATIONS—This journal invites concise original contributions on hospital dental service and in all phases of clinical and experimental surgery of the mouth and associated structures, including roentgenology, diagnosis, anesthesia and oral surgical pathology. Articles are accepted for publication with the understanding that they are contributed solely to the JOURNAL OF ORAL SURGERY, ANESTHESIA, AND HOSPITAL DENTAL SERVICE. All manuscripts are subject to editorial modification. Neither the editors nor the publishers accept responsibility for the views and statements of authors expressed in their communications.

■ MANUSCRIPTS—Manuscripts submitted for publication should be sent to Fred A. Henny, Editor, Henry Ford Hospital, Detroit, Michigan.

Manuscripts should be typewritten on one side of the paper only with double spacing and liberal margins. The author's name and abbreviated title of the article should appear at the top of each manuscript page. The original should be sent to the editor and a carbon copy retained by the author. Manuscripts will not be returned if accepted for publication.

References should be placed at the end of the article and should conform to the style of the Quarterly Cumulative Index Medicus; viz., name of author, title of article and name of periodical with volume, pages, month and year. They should be numbered and should appear in the same order as that of the superior figures inserted in the appropriate positions in the text.

■ ILLUSTRATIONS—Illustrations accompanying manuscripts should be unmounted and numbered. The author's name should appear on the margin or back.

Authors should insert figure numbers at appropriate places in the text. The original drawings, or glossy print photographs of them, should accompany the manuscript. Legends for illustrations are to be typewritten in a separate list with numbers corresponding to those on the photographs and drawings.

A reasonable number of halftone illustrations will be reproduced free of cost to the author, but special arrangements must be made with the editors for color plates, elaborate tables or extra illustrations. Copy for zinc cuts (such as pen drawings and charts) should be drawn and lettered in India ink or with black typewriter ribbon (carbon paper placed with carbon against back of sheet for bolder type). Ordinary blue or colors will not reproduce. Only good photographic prints or drawings should be supplied for halftone work.

■ CASE REPORTS—Case reports will constitute an important department of the journal and the editors welcome case reports that are of unusual clinical value or that present exceptional conditions of interest.

■ EXCHANGES—Letters, exchanges, reprints and all other communications relating to the JOURNAL OF ORAL SURGERY, ANESTHESIA, AND HOSPITAL DENTAL SERVICE should be sent to the American Dental Association, 222 East Superior Street, Chicago 11.

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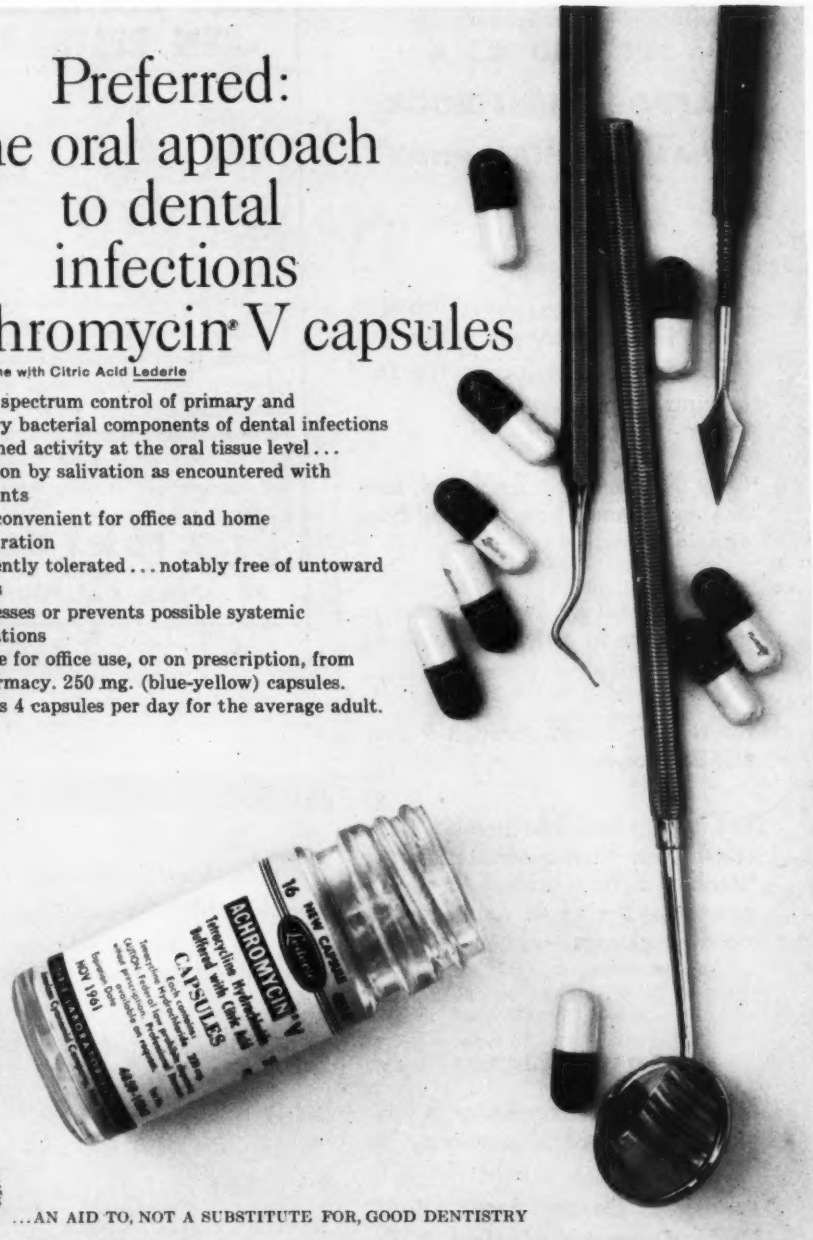

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